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Capital Gains Tax: Implications for the Firm's Cost of Capital, Share Valuation and Investment Decision-Making

Mike Dempsey*

Abstract—The traditional 'single-period' equity valuation models assume that investors' capital gains tax liabilities can be represented as occurring annually, independently of whether or not the share is actually sold. The assumption implies that investors sell their shares on an annual basis. The essential issue as to how capital gains tax might be expected to impact on the holding decisions of shareholders, along with the likely responses of their firms, is forestalled by these models. More realistic assumptions for the imposition of capital gains tax have only recently been presented in the literature. This paper, with resource to the implications of these contributions, seeks to model the impact of capital gains tax in the functioning of equity markets, and, thereby, the impact of the tax on the equity financing and investment decisions of firms. The paper will predict that it is entirely possible that the level of capital gains taxation has only a limited impact on government revenue, while simultaneously having a disruptive impact on the workings of capital markets. We observe that high nominal levels of capital gains tax may work to increase the volatility of equity share ownership, destabilise share prices, and distort the viability of firms as on-going concerns.

1. Introduction

The traditional 'single-period' valuation models of finance rely on the assumption that investors' capital gains tax liabilities can be represented by an 'annual-equivalent' tax. Allowing that capital gains tax is liable only when the gain is realised on sale, the assumption is equivalent to the assumption that shareholders sell their shares on an annualised basis. When the level of capital gains tax is significantly lower than the level of dividend tax, the assumption is more easily justified. Under the UK tax imputation system, however, shareholders' dividend tax liabilities have been significantly reduced, and it can no longer be assumed that such taxes should continue to dominate capital gains taxes in determining the financial behaviour of shareholders and their firms. More recently, both Pointon (1996), in this journal, and Dempsey (1996) have modelled the implication of assuming, more realistically, that capital gains tax liabilities are applied when the gain is realised. That is to say, they allow that the duration of the shareholder's investment period might be relevant to shareholders' expected income from holding the share.

The above authors commence with models which value equity shares in terms of discounted income streams. However, whereas Dempsey offers a direct market valuation of equity in terms of the firm's lifetime projection of dividends—adhering to the tradition of 'efficient markets'—Pointon considers an individual shareholder's intrinsic valuation as a function of the income to that particular shareholder. We are presented thereby with two intriguing perspectives. The purpose of the present paper is to show how the insights of these two contributions may be combined so as to model the mechanics of capital gains taxation as it is likely to impact on the firm's cost of equity capital, its capital valuation and investment decision-making. We shall conclude that it is entirely possible that a level of capital gains taxation contributes only marginally to government revenue, while simultaneously having a disruptive impact on the workings of capital markets.

The remaining sections of the paper are as follows. In the following section, we present Dempsey's (1996) discounted dividends valuation model of equity ownership. Here, we consider the implications of the model for the valuation of equity, the cost of capital and the level of investment activity of the firm. We shall consider also the empirical evidence for the impact of capital gains tax in the stockmarket's pricing of equity ownership. The section thereafter compares and contrasts the implications of the Dempsey model with those of Pointon's (1996) valuation model of equity ownership. Here, we observe how the approaches of both authors combine to provide a coherent framework of investigation. The final section summarises the main conclusions of the article.

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2. The Dempsey discounted dividends model: capital gains tax effects

Dempsey presents the share's ex-dividend price at the end of time 0, P_0, as the discounted value of the firm's future dividend stream 'capitalised as equity':

$$P_0 = \sum_{t=1}^{N} \frac{D_t \cdot q}{(1+R)^t} + \frac{P_N}{(1+R)^N} \qquad (1)$$

where:

D_t = the expected dividend for the period t, assumed to occur at the end of the period.

q = the ratio of the change in the firm's share price on going ex-dividend to the firm's dividend D_t. That is, $D_t.q$ in equation 1 is the expected change in the firm's share price at the end of period t when the firm makes a dividend, D_t.

R = the market's expectation of growth for the firm's share price over each period.

P_N = the expected ex-dividend share price at the end of period N.

N = the number of periods that the firm is expected to survive.

The 'capitalisation' q-factor is Tobin's q-factor, which recognises that the ratio of market share value to replacement cost (dividends in this case) may not be unity. A feature of the above formulation as it stands is that it is independent of the particular choice of personal taxation system. The issue of whether the firm's dividends D_t should be expressed 'gross' or 'net' is also irrelevant since the dividends in the formulation appear capitalised as equity. With the assumption that all investors share 'representative individual' tax liabilities on dividends and capital gains, T_d, and T_g, respectively, the valuation model leads to three essential propositions relating to the cost of equity capital:

1. Independent of an investor's holding period, the firm's required rate of return at the corporate level (post-corporate but before personal tax) on investments financed by retained earnings, R^{ret}, is identified as the discount factor, R, in the valuation model of equation 1.
2. The firm's required rate of return at the corporate level (post-corporate but before personal tax) on investments financed by new issues of shares, R^{new}, is identified as R/q.
3. Independent of an investor's holding period, the expectation of return on purchase of the firm's shares on an after-personal tax basis, R_a, is identified as $R.(1-T_g)$.

The above propositions may therefore be summarised: $R = R^{ret} = R^{new}.q = R_a/(1-T_g)$. Propositions 1 and 3 rely on Elton and Gruber's (1970) determination of Tobin's q-factor as

$$q = (1-T_d)/(1-T_g) \qquad (2)$$

Propositions 1 and 2 together are observed to be consistent with Auerbach's (1979a, 1984) result relating the firm's cost of retained earnings to the cost of new issues of capital; while proposition 3 reproduces a result by Auerbach (1979b, p. 440). With the assumption of a constant dividend growth rate, g, the model of equation (1) may be expressed

$$P_0 = \frac{D_1 \cdot q}{R-g}$$

which with proposition 3 and q as equation (2) reproduces the Haugen-Heins (1969) formula (as extended more recently by both O'Brien, 1991, and Pointon, 1996):

$$P_0 = \frac{D_1 \cdot (1-T_d)}{R_a - g \cdot (1-T_g)} \qquad (3)$$

A number of observations may be made on the basis of equation (3). Firstly, it is clear that an increase in capital gains tax, T_g, implies a direct tax on the firm's capital growth, g. That is to say, a capital gains tax does not represent an alternative to dividend tax, but rather is in addition. Thus, we may propose that the firm's income is taxed at the 'primary' level by corporate tax, at the 'secondary' level when the after-corporate-tax income stream is distributed as dividends, and at a 'tertiary' level with the transfer of ownership of the remaining income stream (which remains liable to primary and secondary tax).

Secondly, in terms of equation (3), we may observe the case that in reaction to an increase in the capital gains tax rate, T_g, both (i) the firm maintains its investment policy—that is to say, it maintains its projected dividend profile, D_t, and (ii) its investors maintain their required rate of return on an after-personal tax basis on purchase of the firm's shares, R_a. The equation predicts that the outcome must be a *decrease* in share price, as is consistent with an increased claim by government on the share's growth. Conversely, if the market value of share prices is maintained, the implication is that investors must accept a lower expectation of after-personal tax return on purchase of shares.

Equation (3) implies that when the projected growth rate for the firm's dividends, g, is zero, the imposition of capital gains tax has no effect on the relationship between the firm's market value, the expected dividend stream and shareholders' after-personal tax expectation of return. Allowing that equity values and after-personal tax returns are unaffected, it is the case that government tax receipts are also unaffected.

Notwithstanding a zero projected growth rate for the firm, Dempsey's propositions 1–3 imply that the rate of capital gains tax may yet have important implications for the firm's cost of equity capital, and, thereby, for the firm's optimal investment and dividend decisions. The implications turn effectively on whether the rate of tax on the firm's cash distributions as dividends (T_d) is greater or less than the rate of tax on the same cash if incorporated as a capital gain (T_g), as summarised below.

(i) $T_g < T_d$ *(the case of 'trapped equity')*

In the case that $T_g < T_d$, we have $q < 1$ (equation (2)), and in line with Auerbach (1979a), the model implies that the opportunity cost to shareholders of £1 of the firm's cash 'trapped' as a prospective dividend is £q. The intuition is that since a firm's retentions ultimately represent deferred dividends, it is rational to capitalise eventual taxes on distributions in formulating valuations. The outcome as revealed by propositions 1-2 is that the firm is able to justify re-investment in itself at a rate of return (at the corporate level) which is less than that offered by new issues of equity in other expanding firms.

(ii) $T_g = T_d$ *(the case of 'tax neutrality')*

In the case $T_g = T_d$, we have $q = 1$ (equation (2)). As revealed by propositions 1-2, 'tax neutrality' is achieved between the required rate of return on the firm's retained earnings and the required rate of return on finance raised by new issues.

(iii) $T_g > T_d$ *(the case of 'dividend/ liquidation preference')*

In the case $T_g > T_d$, we have $q > 1$ (equation (2)). Now the argument $R^{ret} = R^{new}.q$ (propositions 1 and 2) implies that the firm's required hurdle investment rate for retained earnings must exceed that on new issue of equity. Since the firm can always dispense its cash as dividends, followed by a new equity issue to recoup its cash needs, it follows that the firm should seek to pay maximum dividends. It may even be the case that the break-up value of the firm is made to exceed its on-going value.

To see this, consider that a firm has assets that can be liquidated to provide its shareholders with, say, £10 per share in cash. Against this, suppose that the firm's share price stands at £12, reflecting the fact that the firm's cash flows have economic value over and above a break-up value. Now consider, for example, that the dividend tax rate is 10%, and the capital gains tax is 50%. If the break-up cash is returned as a dividend, the shareholder receives £(10).(0.9) = £9.00, together with a tax credit against a zero-valued share of £(12).(0.50) = £6.00, implying a combined value of £15.00. Since this exceeds £12, an economically viable firm may be worth more when broken-down and sold off.

In attempting to arrive at a realistic estimate of the 'representative individual' capital gains tax, T_g, as it applies to UK firms, it must be recognised that the nominal and effective rates may diverge considerably. Zodrow (1993) notes that the ability to defer realisation of a capital gain, while realising losses, implies significant opportunities for avoiding the tax altogether. In this case, T_g as it impacts on the firm's capitalisation factor (equation (2)) is a 'representative individual' tax across such actual individual investors' liabilities.

Empirical evidence appears to support the view that in consequence, T_g could be significantly lower than might be suggested on the basis of nominal marginal tax rates. For example, on the basis of statistical observation of share price changes around the ex-dividend day of firms, Davidson and Mallin (1989) and Crossland, Dempsey and Moizer (1991) deduced a mean value across UK companies of q (defined as the ratio of the change in the firm's share price on-going ex-dividend to the firm's 'net' dividend) approximately equal to 1, which Crossland et al. argue is consistent with the prevailing tax brackets provided the effective capital gain component is allowed to be close to zero.

Ashton (1991), on the basis of a consideration of the rate of imputation under the UK tax system, while ignoring tax-exempt shareholders, has also argued that q, as determined by equation (2), might be approximately equal to 1 (p. 471 and p. 478). In these analyses, it is argued that tax exemptions on capital gains and the indexation of capital gains work to reduce investors' effective tax liability on capital gains. However, the impact of capital gains tax should not be taken to be necessarily insignificant. An interesting study that provides indirect empirical evidence for the impact of capital gains tax on investment rates, is by Nadeau (1988), which models US data for 1934–80. Nadeau's estimates indicate that the dividend payout rate is sensitive to the level of personal taxes on *both* dividends and capital gains.

We summarise our findings for this section based on Dempsey's model with two observations. The first is that the ability of government to raise revenue from capital gains tax is restricted. If taxes are raised, non-growth shares are not directly affected, while growth shares may respond by trading at reduced prices—which of itself delivers a wind-fall loss to current shareholders, thereby *lowering* their capital gains tax liability.

The second observation is that the rate of capital gains tax potentially impacts on Tobin's capitalisation factor, and hence on whether £1 of the firm's cash resources is valued at greater or less than £1 in the market. In this case, the rate of capital gains tax impacts potentially on the opportunity cost of the firm's retained earnings, and, thereby, on the firm's propensity to invest. In the following section, we subject the robustness of these observations to Pointon's alternative perspective of the valuation process for equity shareholdings.

3. Pointon's discounted dividends model: capital gains tax effects

Pointon's model considers the firm's share price from the perspective of individual investors. As for the Dempsey model, all investors share the same marginal tax rates, T_d, T_g. The Pointon model, however, allows additionally for a capital gains tax relief, on the basis of which the investor may seek to determine an optimal holding period. Thus Pointon proposes a share's 'intrinsic' ex-dividend value at the end of period 0, P_0, as

$$P_0 = \sum_{t=1}^{n} \frac{D_t \,.\, (1-T_d)}{(1+R_a)^t} + \frac{P_n \,.\, (1-T_g)}{(1+R_a)^n} + P_0 \,.\, t_g^a \quad (4)$$

where

R_a = investors' expected rate of return on an after-personal tax basis.

n = the number of periods for which the investor intends to hold the share.

t_g^a = defined so that the final term in equation 4, $P_0.t_g^a$, is the net present value of the allowance against the imposition of capital gains tax, T_g, conceptually imposed on the full value of the share at sale, P_n, as implied by the 'middle' term following the summation in equation (4).

Pointon begins by assuming that the capital gains tax liability is applied to the difference between the share's selling price and the original purchase price, P_0, which may be indexed for the rate of inflation (i). Taking the risk-free rate (r_f) as the appropriate discount rate for determining the present value of this allowance, Pointon therefore presents $P_0.t_g^a = P_0.T_g.(1+i)^n/(1+r_f)^n$.

Generally, we might expect that the market required risk-free rate will be greater than the prevailing inflation rate, so that $P_0.t_g^a < P_0.T_g$. In the remainder of this section, therefore, we shall highlight the implications of the indexation allowance (and thereby the potential divergence of Pointon's formulation from Dempsey's) by assuming $P_0.t_g^a = P_0.T_g$. That is, we shall assume that the *present value* of the allowance against the imposition of capital gains tax on the selling price (P_n) is the purchase price, P_0. By a straightforward manipulation, equation (4) may then be written

$$P_0 = \sum_{t=1}^{n} \frac{D_t \,.\, (1-T_d)/(1-T_g)}{(1+R_a)^t} + \frac{P_n}{(1+R_a)^n} \quad (5)$$

which reproduces Dempsey's 'capitalised dividends' model (with q as equation (2)) with the discount rate R_a. Applying the equation inductively to P_n, the individual investor's current valuation, P_0, is observed in this case to be *independent* of the number of periods, n, for which the share is to be held. With the assumption of a constant dividend growth rate, g, in perpetuity equation 5 is expressed

$$P_0 = \frac{D_1 \,.\, (1-T_d)/(1-T_g)}{R_a - g} \quad (6)$$

which may be compared with equation (3). In this case, the tax relief clearly acts as a *subsidy* on equity assets. Thus, if the firm reacts to an increase in capital gains tax, T_g, by maintaining its investment policy, and hence the projected dividend profile, D_t, and investors maintain their after-personal tax expectation of return, R_a, the predicted outcome is an increase in equity prices, which grants current shareholders a windfall gain. If, alternatively, share prices are maintained, investors are offered an *increased* after-personal tax expectation of return on purchase of equity. In terms of Pointon's model, we now consider the firm's investment criteria from the perspective of an individual investor who, as in the previous section, has an expectation of after-personal tax return, R_a. We shall, following Gordon (1959), assume here that the firm has the potential to grow by re-investing a constant proportion, b, of its earnings (E) each year, which then earns an annual expected rate of return, r, in perpetuity. In this case the firm is able to sustain an annual dividend growth rate, g, equal to the product of r and b (for example, Lumby, 1994: 400). We may therefore write equation (6) as

$$P_0 = \frac{E_1 \,.\, (1-b) \,.\, (1-T_d)/(1-T_g)}{R_a - b \,.\, r} \quad (7)$$

where E_1 represents the firm's earnings for distribution at the end of period 1. When $r = R_a$, the above equation may be expressed

$$P_0 = \frac{E_1 \,.\, (1-T_d)/(1-T_g)}{R_a}$$

revealing that the individual's intrinsic valuation is in this case independent of the firm's re-investment ratio, b. Thus we observe from equation (7) that provided $r > R_a$, the valuation is increased with re-investment of earnings in preference to immediate dividends. Conversely, when $r < R_a$, the valuation is decreased with re-investment of earnings in preference to dividends. An investor's required rate of return at the corporate level on the firm's earnings, R^{ret}, is therefore equal to R_a.

If a firm chooses to fund an investment by raising new equity, and the issue is made at a zero discount, new investors in the firm are granted equity ownership valued at the funds, F, which they provide. The firm's current investors, in order that the valuation of their own equity ownership is not diminished, will therefore require that the additional market valuation, ΔP, contingent on the investment should at least equal the funds, F, provided. If the investment provides an expected rate of return, r, in perpetuity, the additional market valuation ΔP, is determined by equation (6) as

$$\Delta P = F.r.\ (1 - T_d)/(1 - T_g)/R_a$$

The firm's current investors therefore require $F.r.(1-T_d)/(1-T_g)/R_a > F$, which is to say:

$$r > R_a\ .\ (1 - T_g)/(1 - T_d)$$

That is, the current investors' required rate of return at the corporate level on investments financed by new issues of shares, R^{new}, is determined as

$$R_a\ .\ (1 - T_g)/(1 - T_d)$$

We can summarise the above observations as $R^{ret} = R^{new}.(1-T_d)/(1-T_g) = R_a$; or allowing $q = (1-T_d)/(1-T_g)$, as

$$R^{ret} = R^{new}\ .\ q = R_a \tag{8}$$

In contrast, Dempsey's propositions 1–3 have been summarised above as

$$R^{ret} = R^{new}\ .\ q = R_a/(1 - T_g)$$

We can observe that both sets of relationships offer an identical relationship between the firm's required rate of return on re-investment of earnings, R^{ret}, and on new issues of equity, R^{new}, as $R^{ret} = R^{new}.q$. For a given after-personal tax rate of return, R_a, however, equations (8) predict a *lower* cost of equity capital at the firm level. This may be interpreted as a consequence of the 'favourable' capital gains tax relief implied by $t_g^{a} = T_g$ in the development of Pointon's equation (4), as against a zero index-linked relief in Dempsey's model. In this case we are able to *combine* Dempsey's and Pointon's relationships as

$$R_a < R^{ret} = R^{new}\ .\ q < R_a/(1 - T_g)$$

5. Conclusions

Drawing on the insights of the Dempsey (1996) and Pointon (1996) models, the present article has attempted to model the impact of capital gains taxation in the functioning of capital markets. Both the Dempsey and Pointon models allow that the capital gains tax is applied when the share's disposal value is realised, and that the tax is symmetrical, implying that a capital loss leads to a tax credit. This 'symmetrical' nature of capital gains tax suggests that notwithstanding high nominal values, investors' effective rate of capital gains tax may in fact be quite low.

The empirical evidence considered for UK stocks has supported this view. As a result, it is possible that the tax levy provides only a weak impetus to government tax revenues. Indeed, if as considered above, the tax is applied allowing a tax credit equal to the purchase price indexed at the risk-free rate, the framework suggests that the tax may act as a subsidy on equity prices. Here, the analysis is observed to be consistent with O'Brien (1991) who, assuming only that the allowance against the imposition of capital gains tax on the disposal value of the asset is the current price with zero indexation, also concludes that it is possible for an increase in the capital gain tax rate to lead to higher asset values.

Since Auerbach (1979a), 'tax neutrality' has generally been taken to imply that investors' dividend and capital gains tax rates should be about equal. The argument in favour of tax neutrality has generally been that a more efficient allocation of financial capital is likely to be achieved when the firm does not enjoy a preferential or uncompetitive rate when it re-invests in itself. This concept undoubtedly influenced the thinking of the UK government when it introduced the imputation tax system in 1973 (Chancellor Barber in his March 1971 budget speech had introduced plans aimed at ending 'the substantial discrimination in favour of retained as opposed to distributed profits' by adopting a new system of corporation tax which would impute corporate tax payments to shareholders[1]).

As a function of the prevailing taxation system, this paper has presented in some detail the theoretical relationship between the rate at which the firm is encouraged to re-invest in itself (R^{ret}) and the firm's required rate of return on new equity issues (R^{new}). As a result, the relationship $R^{ret} = R^{new}.q$, with $q = (1-T_d)/(1-T_g)$ has been sustained on the basis of two contrasting approaches to the valuation of equity ownership. On the basis of the insights afforded by both approaches, the relationships between the hurdle rates for investments financed by the firm's retentions (R^{ret}), investments financed by new equity issues (R^{new}) and investors' after-personal tax rate of return (R_a) have been summarised as

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[1] See Dempsey (1998) for a development of these arguments presented more specifically in terms of dividend taxation.

where we have noted that investors' effective rates of capital gains tax may be considerably less than their nominal ones.

The article predicts that high rates of capital gains tax are likely to encourage investors to engage in influencing their firms' investments and dividend decisions on the basis of their tax positions. Thus we have predicted that institutions whose q-factor is greater than one may well prefer maximum dividends from their shareholdings irrespective of a 'drip-drip' effect on the firm's investment opportunities. There could even be an incentive to liquidate economically viable firms in order to maximise the capital tax credits. Even if a capitalisation q-factor close to one is achieved on average across heterogeneous tax brackets, institutions whose individual q-factor diverges significantly from one are likely to wish to time their purchasing and selling decisions on the basis of tax considerations, and may even engage in dividend stripping—purchasing shares for immediate dividends before selling them shortly after the *ex*-dividend date.

In addition to these factors, Pointon's paper determines that if the level of capital gains tax, T_g, is greater than zero, and $(1 + R_a)/(1 + g) > (1 + r)/(1 + i)$, increasing the number of shareholding periods may work to *decrease* the shares' 'intrinsic' value from the perspective of an individual investor, so that shares might then be held rationally for a single period only. Thus the present paper warns that it is entirely possible that the level of capital gains taxation may have only a limited impact on Government revenue, while having a disruptive impact on the workings of capital markets. That is, the tax would be disruptive in the sense that investors' investment activities with regard to their equity holdings are directed not at the underlying economic prospects of firms, but at the manipulation of the tax advantages allowed.

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Accounting, Remuneration and Employee Motivation in the New Organisation

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Abstract—The paper draws upon two detailed case studies of global manufacturing companies to examine the role of accounting in redesigned remuneration systems which are emerging as organisations delayer their structures, change their production methods and move to team-based systems of work and reward. In this way, changes in the content and application of accounting measures are framed within new approaches to rewarding and motivating employees that have been stimulated by efforts to develop alternative, 'leaner' manufacturing practices. The focus is principally upon the remuneration of shopfloor employees, but we also consider the implications of team-based reward systems for managerial staff. We argue that despite the recent complementing of financial with non-financial forms of reward (e.g. skill acquisition, improvements to health and safety), and an emphasis upon peer pressure from team members in addition to individual incentives as a source of motivation, the language and calculations of accounting remain central and pervasive in developing, justifying and mobilising support for the new reward system.

1. Introduction

Accounting researchers have increasingly been concerned to locate the development of accounting practice within wider management and organisational contexts. Changes in management practice are deemed relevant to understanding changes in the design and use of accounting systems. Recently, researchers (e.g. Drucker, 1988; Coulson-Thomas and Brown, 1989; Kanter, 1990; Ezzamel *et al.*, 1995) have pointed to a number of significant changes in management practice precipitated by *inter alia* the globalisation of competition, the deregulation of public utilities, the significant innovations in production and information technologies, and the expansion and increased efficiency of capital markets. These shifts, it has been argued, have promoted a number of changes in management practice, including: (i) downsizing as the number of employees is significantly reduced; (ii) delayering the organisational hierarchy; (iii) multiskilling the labour force; (iv) shifting work practices towards teamwork; and (v) introducing employee empowerment programmes.

Accounting research that has paid attention to these changes has two clearly identifiable strands. The first has been concerned to document shifts in accounting practice that are deemed congruent with the needs of contemporary organisations (e.g. Innes and Mitchel, 1989; Coates and Longden, 1989; Bromwich and Bhimani, 1994). The second strand has taken a more critical stance as it has sought to contextualise and problematise any observed 'new' accounting practices (e.g. Miller and O'Leary, 1993).

One of the key issues identified, but not pursued, by both strands is the emergence of new reward structures. The intention of this paper is to contribute to the second of these strands by focusing upon the comparatively neglected area of employee remuneration. In doing so, we locate efforts to devise new systems of motivation and remuneration in the context of initiatives designed to increase work flexibility and teamworking.

Academic interest in the area of employee remuneration spans many disciplines including economics, finance, psychology, HRM and accounting (see Gomez-Mejia, 1994). As our empirical material will demonstrate, the traditional monetary focus in shopfloor remuneration schemes is increasingly being de-emphasised in comparison to non-financial elements (e.g. training, health and safety and the prospect of greater job security). A greater appreciation of these emerging reward systems (with their financial and non-financial elements) calls for an inter-disciplinary examination.

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While this paper focuses upon accounting issues in the broadest sense, it draws upon diverse literatures in order to enrich our understanding of the complexities of employee remuneration and motivation.

The paper explores a number of interrelated issues: (i) how accounting language and measurements are rhetorically deployed by management to discredit old production and reward systems and create the space for alternative systems in which greater flexibility and teamworking is expected; (ii) the extent to which accounting as a calculative technology is involved in the design and implementation of new reward structures; and (iii) the kind of non-accounting initiatives or schemes, if any, that are being developed by management to buttress accounting-based reward systems.

The empirical material used in this paper is drawn from company documents and intensive field studies in six UK manufacturing companies. More than 110 semi-structured interviews held with senior and middle managers were conducted over the period 1993–1995, each lasting on average one and a half hours. In the following analysis, we focus primarily upon two of the six case studies. The choice of these two case studies is deliberate for two reasons. First, in both cases we gained exceptionally good access and were able to engage in very intensive interviewing of staff; we also returned to each site on a number of occasions and interviewed a small selection of managers (two or three in each company) more than once, and this enabled us to document contemporary accounts of unfolding organisational dynamics. Second, the two cases are fairly large companies with enough sub-units that exhibited some variations but also similarities in their practices.

By focusing on two intensive case studies we seek to improve upon previous research which has not explored fully the details and dynamics of remuneration schemes, or related them to the specific contexts of the changing organisation of work. In the first case study, we focus predominantly upon the remuneration of shopfloor workers (as the interview material suggests that performance-related pay schemes were developed exclusively for shopfloor operators). In the second case study, we extend this to consider the position of supervisory and middle managerial staff.

In the next section we provide an overview of recent accounts of change in management practice and explore the link between accounting and reward structures in organisations. This is followed by a presentation of the findings from our two case studies, where we show how emerging forms of employee remuneration and motivation are inextricably embedded in the context of changing management practices. We then discuss the wider implications of our evidence, exploring why and how accounting is implicated in that process, before drawing together our main conclusions.

2. Employee remuneration in the 'new' organisation: an overview

This section provides an overview of the recent accounts of changes in management practice. Having sketched the broader management context in which emerging remuneration schemes are situated, we offer a brief discussion of the link between accounting and remuneration schemes in order to provide a basis for comparison with our findings.

2.1. The changing context of management practice

The changes reported to have taken place in the UK corporate sector include a squeeze on profits caused by intensive local and global competition, an increase in customer orientation under the banner of total quality management (TQM), and moves from a functional to a more process-based logic of organisation commended *inter alia* by business process re-engineering (BPR). Such changes, commentators have argued (e.g. Coulson-Thomas and Brown, 1989; Watson, 1994), have prompted many companies to redesign their strategies, structures and processes in order to: (i) reduce the labour force to make companies leaner and fitter; (ii) delayer over-burdened structures in the quest for simpler and faster information flow; (iii) promote teamwork practices and employee empowerment in order to manage interdependence in new work technology and to release individual initiative; and (iv) emphasise accountability to secure the attainment of corporate mission.

Teamworking has been widely commended as a means of encouraging employees to assume responsibility for identifying and solving problems of poor communication, inappropriate coordination, low motivation and slow responsiveness (e.g. Drucker, 1988; Hammer and Champy, 1992). The dynamics of teamworking are presumed to create strong peer pressure which mitigates the pursuit of selfish, recalcitrant interests. Frequently, such initiatives are presented as a means of employee 'empowerment' not only by 'gurus' (e.g. Hammer and Champy, 1992; Peters, 1992) but also by practising managers (Watson, 1994).

However, the cooperation (active involvement and commitment of employees) is a necessary condition as well as a desired outcome of teamworking (Ezzamel and Willmott, 1998). Empowerment through teamworking can be impeded or subverted by top down pressures associated with, for example: (i) the introduction of tighter physical control procedures; (ii) the development of more extensive standard operating procedures; (iii) a greater investment in accounting and management information systems; and (iv) a greater emphasis on short-termism (Ezzamel et al. 1997). Managers are undoubtedly attracted to the idea of a self-disciplined workforce that cooperates 'automatically' without the cost associated with detailed control.

But at the same time, managers are often anxious about letting go of their supervisory function. This is not just because the very existence and prerogative of managers depends, in part, upon having recalcitrant employees who will work productively only if supervised by others but, more fundamentally, because if left to their own devices, there can be no guarantee that employees will endorse and pursue the priorities established by managers.

2.2. Accounting and remuneration

Numerous researchers have identified accounting as a means of promoting human accountability by linking performance to rewards (e.g. Demski, 1972; Itami, 1975; Loeb and Magat, 1978; Merchant, 1987). In this literature, the received wisdom is rooted in a framework which operates at the level of the individual: performance measures are presumed to quantify the achievements of each individual, to compare actual results against targets, and to determine the requisite rewards or sanctions. Accounting is presented as a neutral set of techniques and practices that are deployed objectively to quantify human performance and then to determine the attendant rewards/sanctions.

By quantifying performance and by applying the reward metric to levels of performance, accounting is perceived to minimise judgement and depersonalise the appraisal process, thereby denying or suppressing potential conflicts over the allocation of resources as it conveys the seemingly objective, quantitative and externally verifiable nature of its calculation (Townley, 1993). Through this sort of exercise, accounting can constitute and promulgate a metaphor of a numerical view of reality (Morgan, 1988) that seemingly transcends the appraisal and reward process.

As Miller (1992) has noted, the adoption of accounting can transform the management of an organisation into a complex of incessant calculations. By providing the means through which human performance can be assessed, accounting promotes a dual action upon the individual as he/she can be both the object of differentiated accounting measures and a potential relay for them:

> 'As object, calculations from a central point can be made of workers, managers, doctors, or teachers in attempts to assess their performance in relation to a specified standard. And as relay, as point of intersection of different forces, individuals can be encouraged or required to evaluate their own activities and those of others through the calculative routines of accountancy' (Miller, 1992: 67).

The ability of accounting to convert human performance into a set of calculations helps make individual performance more visible. Such visibility makes it easier to compare and contrast the performance of one individual against that of another or against a predetermined target. Visibility also makes it possible for managers to assign sanctions and rewards to specific individuals in the form of basic and bonus payments. By targeting rewards to individuals or groups who 'most deserve them', performance related pay (PRP), for example, becomes a mechanism for exercising greater financial control, as it is identified as a way of securing better 'value-for-money' than insensitive, inflexible increases based on the cost of living or some other non-performance related measure (Kessler and Purcell, 1992). By linking up with economic notions of efficiency and economy, accounting is able to map its own terminology upon that of the economic in a manner that endows its own language with the aura of objectivity and rationality (Knights and Collinson, 1987).

However, reward systems are inherently problematical, not least because of the difficulty of anticipating and avoiding their unintended consequences, including consequences which flow from attributing an aura of objectivity to them. As Baker et al. (1988: 597) have observed, the reason why PRP systems are not more extensively used in practice is:

> 'Not that they are ineffective but rather that they are too effective: strong pay-for-performance motivates people to do exactly what they are told to do. Large monetary incentives generate unintended and sometimes counter-productive results because it is difficult to adequately specify exactly what people should do and therefore how their performance should be measured. Moreover, merit pay systems encourage employees to spend effort lobbying about both the specification and application of the system to measure and evaluate output.'

Performance measures (upon which reward may be based) provide the opportunity for employees to 'game the system' by emphasising actual, rather than intended, and short-term, rather than long-term, performance. Moreover, once these measures are in place employees may become resistant to changing them for fear of altering their rewards, and hence they may suppress information on the production process and 'smooth out' periodic performance. Thus, employees may know or suspect from experience that supervisors have their 'own' agendas and associated problems to solve even if they do not have personal axes to grind.

Conversely, managers may not trust employees on the grounds that the latter may, more or less intentionally, subvert the operation of 'objective' or quantitative remuneration systems by disregarding and devaluing activities that are not rendered visible by accounting measures (Baker et al. 1988: 599).

There is now increased recognition that the assessment of performance upon which financial-based rewards are based can be inherently subjective and unhelpful in developing the skills of the appraised (Grint, 1992; Townley, 1993). The introduction of a formal appraisal process renders more explicit, and therefore more vulnerable to criticism and dissent, what is otherwise comparatively veiled and ambiguous. When the attributes of a particular reward scheme become clear, and hence open to attack, the accounting language can be used, both by accountants and non-accountants, in the rite to discredit the old and pave the way for the new scheme (Quaid, 1993).

Thus, potent accounting terminology such as 'costs' and 'benefits' can be deployed to present an old reward system as being economically unsound in the process of articulating a case that renders the development of an alternative system a necessity. Similarly, the same terminology can be applied to promote a particular reward system in preference to alternatives. Through the language of accounting, reward schemes shape the meaning of success and failure. As this occurs, the language of accounting is understood to construct, not reflect, levels of performance. Accounting is seen to objectify the very characteristics of performance which it is assumed to be measuring: 'appraisal systems, then, do not so much *discover* the skills of those appraised as *create* them' (Grint, 1992: 69), emphasis in original.

This problematisation of the role of accounting in the quantification and remuneration of human performance has been given a twist by the emerging, 'new' form of organisation. As modern work technology is increasingly being organised around teamwork, an interesting challenge is how can individuals be appraised and motivated to work in the interest of the group? Such a question may be seen to represent one of the main aspirations of both accounting system designers and managers who are interested in deriving benefits from the flexibility and dynamism of teamworking whilst continuing to ensure that each employee is guided and rewarded by corporate objectives and disciplines.

As will be demonstrated later, such aspirations offer considerable scope for rethinking the relationship between accounting and remuneration. In our empirical analysis we view accounting in a broad sense to embrace a wide range of quantitative measures, including those which measure output. We refer to accounting as a particular kind of language rather than restrict its meaning to specific textbook techniques. In the next section we provide contextualised accounts of reward schemes from our field work.

3. Empirical evidence from two case studies

The details of the two in-depth case studies, Heavy Metal and StitchCo, help us to examine the development of reward structures within the wider context of other changes, in particular teamworking, empowerment and accountability.

3.1. Heavy Metal

Established in the early 1930s, Heavy Metal grew steadily, both through acquisitions and internal expansion, to become a global manufacturer with its turnover increasing by 700-fold 60 years later. In the late 1980s, there was a major restructuring of Group ownership with a foreign company acquiring 60% of the shares and the remainder being held by one major UK company. The Group's products have strong brand names and serve three markets (industrial, agricultural and domestic), being sold in the main to conglomerates and other companies, stockists and merchants.

The UK operation recently embarked on a number of significant changes culminating in the sale of tengential subsidiaries, a much reduced workforce, a flatter hierarchy, and a new production technology. The company also introduced new initiatives, in particular, teamworking, total quality management (TQM) and 'investment in people'. The manufacturing strategy has been to concentrate on a much reduced range of high added-value products supported by major investments in plant and machinery intended to secure the company's future as a world class manufacturer dealing in these markets. It has been ear-marked as the leading 'test' site for innovations in production methods and HRM by the parent group. The plants operate with high speed technology using statistical process control and plant layout designed to improve product flow and reduce material handling.

The old reward scheme

Until a few years ago, Heavy Metal used a scheme which, for shopfloor employees, consisted of a fixed part (67% of average wages) and a variable bonus part based on the production level attained by each operator. The pay structure was, according to the manufacturing director, 'widget per unit driven' and each production manager was entrusted to arrange the flow of production activities so that each operator could achieve high productivity rates:

> 'Managers and supervisors were saying: "Well, I've got to keep producing this because it's paying Fred a lot of money and if I don't, Fred's going to play up"' (management control systems coordinator).

Manufacturing was thus perceived to have been directly driven by machine efficiency and employee demand to maximise wages by raising output. This behaviour was legitimised and given meaning by the bonus system that rewarded higher volume; the bonus was 'levered' so that the more the operator produced the higher was the bonus per unit: 'We put these highly geared schemes in to increase the incentive element' (management control systems coordinator). A numerical view of reality was constructed in which maximisation of production volume was expressly translated into lucrative financial rewards for machine operators. However, our interviewees presented this 'old' reward scheme as a system riddled with serious problems:

> 'There were traditional battles over individual schemes and individual payments and this was on-going' (works director).

According to the finance director, the bonus system fostered a perverse situation where operators 'worked to their level of their piece rate or bonus system as they wanted, not as the business needed'. This view was echoed by many interviewees. For example, the production coordinator suggested:

> 'We've looked for the stuff to put on whether it's wanted or not and we've just seen it and as long as we've kept our machine running and we've got our bonus the box is ticked. I don't give a sod what they're gonna do to it in the next stage. I've got my money.'

In other words, operators' effort was not geared to the production of added-value. The lack of a system for coordinating production and sales activities also meant that the push for maximum production resulted in the accumulation of very high levels of unsold stock. Not only were substantial resources tied up in stocks, but some of it also became defective, rusting away during long periods of storage. Product was being generated and good bonuses were being earned at the point of production but the value produced by employees remained a potential, unrealised through exchange in the marketplace.

A degree of slack and waste could be accommodated during the boom times of the mid-1980s but, as order books shortened, emphasis shifted to improving return on capital from a reduced output. Accounting-based arguments (e.g. the high cost of quality rejects, low return on capital caused by high investment in stocks and high levels of stock spoils, etc) were deployed to discredit the old PRP scheme and simultaneously pave the way for a new scheme. The old system was presented, through accounting language, as making little economic sense: it was construed to lead to high reject rates and low profitability.

Much of the discourse on performance measurement and evaluation under the old reward system was infused with a particular kind of accounting-based measurement which emphasised production (rather than the added-value of productive activity); as one manager noted:

> 'We will be measured on the performance of manufacturing. If you look at it at the moment the figures don't look all that good because, if you stop a machine, as far as the management accountant is concerned, you have still got the overheads and you have still got all the labour rates and everything else. So the price per ton which is what we are being measured on looks bloody awful quite honestly.'

As the old system was discredited, the necessity of an alternative system that would check waste and improve profitability was simultaneously made transparent. Such a system, it was conjectured, would also necessitate a reassertion of management control that was perceived to have been lost to the shopfloor under the old system which was deemed to be responsible for the high levels of unsold stock and reject product.

> 'The [shopfloor] started controlling things. People weren't worried about the fact that (the product) was coming out in the wrong size because they diverted it through another machine which drew it down further and they sold it somewhere else and you have this huge material flow with no real control in it' (managing director).

The new reward scheme

At the time of our interviews a new remuneration system for shopfloor workers had just been introduced. At an embryonic stage, and in the process of further refinement and elaboration, it was a banding system geared to the rewarding of teams (in alignment with a recent change in production technology in which machines were grouped into product-focused cells) rather than individuals, as under the old system. Each team was initially placed in one of five skill bands, and the team performance measured over a period of 13 weeks at a time. The new system was commended to employees as one that smoothed out short-term income fluctuations associated with the old scheme. Under the new band system, employees seemingly have:

> '...got used to receiving the same amount of money on a weekly basis instead of every week being different. But at the same time you still have the productivity element that goes with that, it still relies on an incentive scheme, so their performance during that 13 weeks sets up the performance payment for the next 13 weeks' (works director).

The new scheme was also commended for being more in line with business objectives:

> 'The new system is much more focused towards what the business needs' (finance director).

One manager suggested that the new scheme has contributed to 'reducing stocks, giving better customer service and providing the information so that sales can go out there and sell what manufacturing can make'.

According to the finance director, production quotas were now disaggregated, cascading through the various hierarchical levels so that the targets for one level 'dovetailed' into those of the level above and took into account whether or not the company has secured sales orders for the output. The drawing up of production quotas involved the collaboration of production engineers and accountants; the relevant figures were fed into the overall budget system developed in the finance function. This involved a significant change from a production-dominated culture to one that, as our interviewees put it, now produced to customer orders, and thereby reduced the loss association with over-production and the deterioration of stock: 'Each operator, once he reaches his target, says "Well I've finished all what's on my schedule. Stop the machine" ' (production coordinator).

Accounting calculations, both financial and quantitative, were mobilised at Heavy Metal to achieve and smooth the shift from the production-dominated culture to the newly espoused customer-focus. As production quotas were translated into team targets, the level of expected financial reward for members of the team became conditional upon attained levels of performance. Team performance was periodically measured and assessed and then inscribed in accounting reports. Levels of performance attained were subsequently compared against team production targets (both in terms of quantity and quality) and deviations from targets highlighted. Levels of stock were measured and reported regularly, and any reworked scrap was recorded. Operators' performance was monitored twice a shift:

> 'Part of the discipline is that the foreman has to go around twice a shift in most areas and go and check each machine, each operator in terms of output and at that point you pick up whether the person is on schedule or behind schedule or ahead of schedule in terms of what is required from that machine on that day, and equally takes them to the point if there is a problem when the foreman has to get something done about that problem' (works director).

The new reward scheme was thus introduced simultaneously with a new management control system through which supervisors oversaw the operators strict adherence to predetermined production schedules. Ultimately, all these calculations were fed into the reward formula to determine the skill band, and consequently the financial reward, for the team[1]. This became the new numerical reality that operators in teams were expected, or urged, to accept if not enthusiastically embrace.

Investing in people, empowerment and control

Those who we interviewed at Heavy Metal noted that the hierarchy of the company had become significantly flatter, and therefore that rewards for most employees could no longer be primarily based on promotion. For example, the group finance director claimed that while 'money is the nice one', rewards are not exclusively in the form of money, and employees should make themselves more flexible and able to do different things so that they derive greater satisfaction from the acquisition of more skills. He pointed to how the scope of his own job had expanded recently, resulting in him taking over responsibility for two new areas with apparently no increase in his financial remuneration.

This broadening of job responsibilities was represented not so much as an intensification of labour as a motivating device in its own right: 'I've probably now got a job that someone coming into it as I did four years ago couldn't do....I think that's the way you continue to have a challenge and fulfilment.' He may eventually reap his rewards by gaining promotion within the company, if not by using his experience to obtain a lucrative position elsewhere. It is less easy to understand how shopfloor employees, given their signficantly restricted job mobility, are to derive an equivalent material or symbolic benefit from increasing their workload.

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[1] It is worth noting that under the band system, teams downgraded to a lower band encountered a negative effect on their wages for a period of 13 weeks. However, in the event of deteriorating performance, there were likely to be mitigating circumstances which reduced the risk of reductions in income. In commenting on teams who fall down to lower bands, the works director said that 'there are some good reasons why people are falling down'. He then went on to suggest that, for example, when scrap material is reworked, rather than being put in a scrap pile, individual earnings are not affected because 'we have made savings elsewhere'. Even though the scheme was presented as being well defined and fairly objective, there was still considerable scope for the exercise of managerial discretion: 'If they [the team] look as though they are going down [a band], they are interviewed by the manager to find out why and the manager has the discretion whether to move them or not' (management control systems coordinator). While the opportunity to make judgements generates uncertainty and invites bargaining, it also makes possible the exercise of managerial prerogative and, where deemed to be justifiable, morale can be maintained if not boosted by accepting that circumstances beyond the control of the team have adversely affected their performance.

When discussing the motivation and retention of staff, managers emphasised the importance of the company's commitment to the 'Investors in People' initiative. In this initiative, the cooperation, effort and loyalty of staff is sought by emphasising the company's commitment to training and health and safety[2]. Coincident with the changes in production technology and the new remuneration system, managers indicated that the company had embarked on an extensive training programme at all levels:

> 'I think we have actually now got people switched on. We spent a lot of time and a lot of effort and a lot of money on education and training' (computer services manager).

This intensive training programme was "focused" on 'improving the percentage of 'right first time' every time' as the technical manager put it. The progress and effect of training are closely monitored, reviewed bi-annually and evaluated against sectional and company achievements. There was little mention of the projected rewards that the individual employee may achieve from improved training other than the implied prospect of increasing their chances of gaining a job elsewhere. However, the age profile of employees (most were in their 40s and many were in their 50s and 60s) militated against this possibility.

The health and safety policy entailed an emphasis on both providing a 'safe working environment' and the information, training and supervision deemed desirable to reduce the number of accidents at work to 'reasonably practicable' limits. The policy was presented as a major motivational device that could foster a climate of increased self-discipline.

> 'I think health and safety is an added cost, but I think it is a cost worthwhile. I say to my people, "What is their number one priority?" and a trainee says "Test the [X] product", I say "No, no. Number one priority is health and safety. Do the job right in a safe environment", because that creates interest from people, motivation of people' (technical manager).

The health and safety policy provided management with a means of demonstrating its good will whilst helping to remove what were deemed to be undesirable working practices and thereby regain control over territory that had been colonised by employees. Employees were encouraged to identify with the task of reducing the accident statistics rather than negotiate over their share of the material benefits accruing from the in-roads into establisheed production practices made in the name of improved safety. Paradoxically, the promise of empowerment was presented as further incentive to evacuate the terrain of established production practices. The rhetoric on 'empowerment' claims to extend the discretion of employees in ways that facilitate flexibility and reduce the delays and costs of supervision. At Heavy Metal, it is also intended to harness employee 'intellect', creativity and responsibility with the objective of minimising distraction from tasks by removing power-play and politics:

> 'There used to be a little battle and it used to be power, politics and all that stuff. Now that is going away, we're now trying to work together as a team....there is only one competition and that's the people outside' (technical manager).

However, a number of our respondents suggested that in order for it to be operational, empowerment has to be circumscribed and carefully monitored. In this sense, their rhetoric locates empowerment within the limits of what they deemed practicable and acceptable. For example, according to the manufacturing director, empowerment means that management helps employees achieve what management wants as reflected in plans ' 'cos people like to know where they stand'. He then went on to convey his unease over the issue of empowerment: 'I find it [empowerment] damn difficult because I have a natural tendency to want to control.' This ambivalence over empowerment by such a senior manager also found its way to lower levels in the organisation where, as suggested earlier, despite the rhetoric emphasising operator discretion, the performance of operators continued to be monitored twice per shift.

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[2] Posters placed on notice boards throughout the company conveyed the message that the future success of the company depended on 'the awareness, skills and competence of employees and their ability to respond to increasing demands for improvement in an ever-changing business environment'. These posters also stated that employees were expected to understand clearly the corporate mission and that each employee 'will make a positive contribution in the achievement of our business goals and targets through their continuing and effective training and development'. Very low levels of employee turnover were frequently cited by these managers as evidence of the success of this policy, and also as an indication of the strength of employee loyalty to a company that provides a good working environment. The fact that Heavy Metal is one of the few surviving companies in an area of high (male) unemployment was not mentioned.

In summary, the old piece-rate reward system in Heavy Metal was presented as one that promoted the maximisation of production volume at the expense of quality while simultaneously being insensitive to market demand. High levels of rejects/seconds and accumulating stocks were construed as economically wasteful. The new, team-based reward system was presented as the sure remedy to these problems as it was deemed capable of reducing stock levels, enhancing manufacturing flexibility, improving customer service and synchronising better production and demand levels.

While the new reward system was buttressed by practices, in particular empowerment and investment in people, that had no direct financial impact on employees (even though they had the potential to drive cost of production down), the financial incentive remained an important part of the pay package. Although the remuneration package had been redesigned to facilitate a different 'added-value' approach to the organisation of productive activity, accounting calculations continued to be relied upon to establish performance targets, to measure and quantify achievement and to determine ultimately the level of pay.

3.2. StitchCo

StitchCo was established as a family-owned, single brand manufacturer and retailer of fabrics and furniture. It embarked on a major growth strategy in the late 1980s by broadening the brand base through acquisitions and organising its structure into a series of strategic business units (SBUs). Within 18 months, however, the growth strategy collapsed as the company experienced serious problems in managing a diversified portfolio of brands and in coordinating the diverse activities of the loosely structured SBUs. In 1990, new managers were recruited externally and the company changed its strategy back to refocus on a single brand market niche. Virtually all the other brands were divested. Manufacturing operations were reduced and 'focused'. Half of its factories were closed with further significant reductions of staff in manufacturing but also in retailing, and the SBU structure was abandoned as the company reverted back to a more centralised structure. In the remaining factories, activities were radically redesigned and reconfigured to introduce flexibility and teamwork, the structure was simplified by taking out many layers, and an empowerment programme was introduced. In place of pure volume of output, emphasis was placed upon the speed of response to changing patterns of demand and the reduction of wastage and 'seconds'.

The old reward scheme

The old reward system was performance-related and directed at individual operators and managers. It was linked to 'selling on price' which was subsequently perceived to be suicidal. As one director put it: 'You are dead in the Western world if you attempt to sell on price, [and] piece work systems automatically drive you [in that direction]'. Further, the piece rate system was seen by many informants to reward effort more than skill, for example:

> 'Piece work drives you towards effort and very small jobs, and the best paid people in the plant are those that were least flexible. Piece work payment systems are probably totally unsympathetic to good quality, flexibility and quick response' (buying and production director).

As in the case of Heavy Metal, at StitchCo the language of accounting was deployed to discredit the old piece-rate reward system. Here also, the system was construed as making little economic sense. Accounting terminology was mapped onto firm economic foundations. To 'sell on price' was equated with lack of business sense for it leaves you 'dead', killed by more economically motivated and rational competitors. The construed limitations of the old reward system were unpacked further to identify it as rewarding effort, rather than skill, and promoting poor quality output, lower flexibility and late response. These limitations were then re-presented to mean high production costs, impaired competitiveness, lower profit rates etc; which if not checked quickly would lead inevitably to a withdrawal from manufacturing and/or corporate collapse.

Again, in discrediting the old system, a new, more economically rational system was not simply presented as an option; rather, it was deemed a necessity. The old PRP scheme was typically described by our informants as one that failed to promote some measure of goal congruence between the SBUs, and instead emphasised individual contribution to the performance of the SBU. According to the group treasurer, the old reward scheme, 'had nothing to do with the group-SBUs: [we] were told, this is your project, this is your turnover and all the rest of it, that's your lot and that's what you will be rewarded on, then they would do it at the expense of other SBUs within the group, and that happened a lot'.

The new reward scheme

A new reward system for operators at StitchCo factories based on three skill bands was introduced. Skill bands were differentiated according to the quantity of skills, out of a total list identified by management, that a particular operator was shown to have: low (1–4 skills), medium (5–12 skills) and high (13 or more skills). Operators were tested on these skills to determine their efficiency, based on time and motion calculations of the standard minutes required to produce a particular product. The system comprised two elements; basic pay which depended entirely on the skill band of the individual employee plus a bonus based on group performance. A bonus was earned by a team when a level of 80% efficiency of output was attained. This was levered so that the percentage of bonus earned increased as efficiency levels improved with the bonus being at maximum with 110% efficiency:

> 'We have introduced a 110%, not because things are slack, it's because we don't tell them how to make the product...so, in effect, if we give them 100 minutes to make this garment and they can do it in 90, we don't want to penalise them for thinking, 'cos this is the whole idea' (factory manager).

Accounting-inspired arguments, which focused upon added value to the business, were deployed by management to promote the new reward scheme. According to the HRM director, the new system was aimed at 'trying to reward people for what they know and their value to the business as opposed to status'. Similarly, the buying and production director, in emphasising the 'desirable' qualities of the new reward system, said: 'Now we set targets for the team and there is a bonus structure for output from the team. But within the team each person can earn more by moving up one skill band. There are rewards for quality, there are rewards indirectly for skills'. The rationale for focusing on skills was articulated in the following way: 'If we're gonna move to tailoring and to a wide variety of size you needed skilled sewers, so we changed the pay structure with the emphasis being on having the product that the customer wants rather than making something that we hope the customer was gonna buy' (group accountant).

A major challenge for those operating the new reward scheme was to establish a clear link between performance and rewards in certain parts of the business. For example, on the retail side, individual stores were rewarded on store sales, branch teams on sales and profits of all stores in the branch, regions on region sales and profits, and finally, head office on group sales and profits. The underlying rationale for this arrangement, it was suggested, was to make it possible for a given team to identify more closely with the financial indicators to which their rewards were linked:

> 'As you come through the organisation for the store manager to relate to group results is too far away for understanding what it's all about. What we do is we merge in the areas that they can directly influence appropriate to the level and the understanding of what it'll do and so that it actually motivates them to be better at their work' (financial accountant).

This drive to align reward to financial indicators was reinforced by additional measures whose purpose, it was claimed, was to sharpen the individual employee's sense of how s/he contributed to the securing of corporate objectives. For example, an accountant in the finance department was paid a bonus on the basis of divisional profits *and* other key success factors or personal objectives—such as setting up a headquarters (HQ) review process with each HQ manager each month, developing adequate forecasting mechanisms, delivering monthly accounts on a given day the following month, etc.

In contrast, shopfloor operators were rewarded on the basis of a number of key success factors: quality, delivery and cost/profit implications. For these employees, the new reward scheme constituted a numerical view of reality where reward was determined by a combination of team effort and individual level of skill.

This numerical view of reality was presented by our interviewees as a central plank in StitchCo's drive towards promoting motivation to enhance the efficiency of employees and to align their efforts to corporate objectives. The financial accountant articulated this view by suggesting that:

> 'At the beginning of the week the shop manageress stands up at a team meeting and says, "right, our target for this week is...."bang, that's what we have got to do. Here, this is where we are to date and we are going for our quarter's commission. We had individuals earning in a quarter £400 commission. OK? It can be big money for them'.

On the shopfloor, teams were balanced in terms of the internal distribution of high, medium and low skill members. Many high band employees were concerned about this, the HRM manager suggested, because they felt that they were going to end up losing, they could be subject to how somebody else performs. However, according to this manager, such fears were removed once the new system went into practice. For those in the high band 'could see that they could earn just as much and they just benefitted from the fact that they were then working in groups'. What he did not acknowledge, however, was that this depended upon high skill band workers organising and cajoling other team members to maximise team productivity, and thereby secure a good level of bonus. There was also resistance to the new system by supervisors and first line managers who felt threatened by the change, as the scrapping of the piece rate system was depicted as 'taking away their entire reason for existence' and, indeed, most of them were 'weeded out' (buying and production director).

Under the old piece rate system the total wage was dependent upon output, whereas under the new system approximately 85% was fixed wage based on the skill band with the bonus constituting the remainder. The bonus was strictly linked to quality: operators were paid a bonus only on complete, 'first quality' output. By claiming that the new system rewarded skill and knowledge as it aligned performance and reward to the attainment of key strategic objectives, accounting measures and calculations were construed to play a critical role in the implementation of the new system by determining team targets that cascaded from the corporate budget, measuring performance, contrasting performance achieved against targets, and quantifying levels of reward.

Investing in people, empowerment and control

Our informants at StitchCo suggested to us that the company invested heavily in skill training and launched a wide-ranging empowerment programme seeking to release personal initiative while simultaneously enhancing quality. For example, one senior manager said:

> 'We actually took the whole system and turned it on its head and said these are the skills we would like you to have....we empower people... It's all about people management. It's all about taking supervisors and making them facilitators. It's constant skill training.... There are rewards for quality, there are rewards indirectly for skills'.

Training at StitchCo was seen to be built into the organisation of the teams and the mix of individual and group remuneration. The self-interest of those with the highest skills was assumed to motivate them to train and assist team members with lower skills to increase their skills and effort, and thereby boost team performance and bonus:

> 'What you will find in groups is say, you have got a couple of high skilled people and a couple of low skilled people. The high skilled people will teach the lower skilled ones because it is in their interest' (cutting manager).

For the individual employee, the chance to move up the band ladder occurred at a quarterly review of skill bands. According to the above manager:

> 'Every three months the facilitator in charge of the groups will come in to me and sell that person to me saying, "Yes, she has done this, against a set of measures obviously, she deserves to go up a band". So in effect they can have a pay rise every three months up to a certain level'.

Peer pressure within teams was relied upon by senior and middle managers to maintain high levels of performance. In a sense, managers willingly abdicated responsibility for directly motivating employees by constructing a system that shifted the burden to team members in the name of empowerment. The possibilities for 'free riding' on the efforts of other team members were recognised to produce tensions within teams. But apparently this tension was too insignificant to thwart the perceived benefits of teamworking:

> 'Regularly we have fall-outs [within groups], but you find absenteeism has gone down because of peer pressure. If there's three of us in the group and you are away we have to cover for you. Whereas in the old days, it would be me saying "Where were you yesterday?", now it would be the group saying "Where were you yesterday?" and you feel more insulted letting your friends down than you do me. So peer pressure does come in quite a bit' (cutting manager).

Another factory manager regarded peer pressure as an inevitable consequence of setting up the teamworking because 'if you put people in groups anyway, by the nature of doing that you are putting pressure on them'. For that manager, paying group members according to their skill bands made them 'feel important'. Moving up the skill-bands could also be seen as similar to moving up a career structure where symbolic rewards are valued. Other, non-financial, elements of reward were also emphasised. Managers frequently talked of 'employee loyalty' and satisfaction being derived from 'challenging jobs'.

As a consequence of downsizing and delayering, internal promotion opportunities for managers in StitchCo were few; a situation that was exacerbated by an influx of 'knowledge experts' recruited from outside. The HRM director thought that motivation could be maintained through careful job rotation, as she summed up the problem facing her in terms of:

> 'Identifying the people that are particularly strong performers, try to get a lot of lateral movement around the business that people do understand, and get people satisfied in what they are doing rather than chasing that promotion'.

Ultimately though, economic dependence through employment and its associated insecurities were depicted as the ultimate motivator. Or, as the buying and production director put it: 'Well bluntly, continuing employment is the incentive scheme.'

In summary, prior to the redesign of the remuneration system, StitchCo had a piece-rate reward scheme which paid individuals on the basis of quantity of output. This scheme was diagnosed as rewarding effort but not skill and was presented, through the accounting language, as an economically irrational and dysfunctional scheme that ignored corporate interest and consumer demand, resulting in high stock levels and low returns to the owners. These accounting-based criticisms opened up the way for a new, team-based reward scheme that aimed to mobilise peer pressure to motivate team members to enhance their skill levels, align their efforts to corporate goals, and produce high quality products that the customer values. Although most of the total pay was now fixed, the remaining bonus part of pay was levered to heighten motivation, and focus was directed towards rewarding skill and the ability to meet key success factors. The new reward scheme was presented as one that rewarded employees in accordance with their added value to the business, and the numerical view of reality created by accounting calculations was presumed to motivate and mobilise the effort of employees to do their best for the company, and by implication for themselves. The reward system was buttressed by non-financial initiatives, in particular empowerment, training and TQM.

4. Discussion

Until recently, both of our case study companies relied upon a piece-rate system based on actual levels of output provided by individual shopfloor employees. As both companies delayered their structures and introduced teamworking, increased flexibility and introduced empowerment and accountability programmes, accounting-based arguments were deployed to discredit the old PRP systems and to facilitate the launching of the new reward schemes. The deficiencies of the old reward systems were crystallised through accounting calculations which quantified the costs of high levels of stock, high quality reject rates, uncompetitive pricing, etc. The virtues of the new reward systems were identified in terms of added value to the business, the rewarding of skills instead of gross effort, and thereby the attainment of business objectives in the form of higher rates of return.

The new reward systems shifted from an exclusive focus upon individual piece-work to team-based forms of remuneration. At Heavy Metal, the contribution of individual skill was understood to be reflected in the performance of the team; and, in principle, the opportunity to raise the team's skill-band provided the necessary inventive for individuals, supported by peer pressure, to acquire or improve skills. At StitchCo, where individuals were placed in skill bands that determined their basic rate of pay, there was both an incentive for the individual to acquire additional skills and peer pressure to increase bonus by raising team performance. In each case, accounting was deployed in the development and implementation of the emerging reward schemes no less than it was in the development of the previous piece-rate based systems. Accounting-based calculations were relied upon to quantify the costs and benefits of the new reward systems. Moreover, accounting was used to quantify skill bands in terms of wage range, and determine performance targets whether financial (e.g. sales volume, profit margins) or non-financial (e.g. tonnage; garments). Accounting also intervened in the process of measuring actual achievements, comparing achievements against targets, and determining levels of financial rewards.

It can be argued that such schemes create a win-win situation where operators enjoy a more reliable income flow and employers derive the benefits of increased flexibility and effort from teamworking. However, in each case, the scheme was reported to be bedeviled by problems; in particular: (i) even though the managers in principle took overall responsibility for arranging the flow of production activities, it was the supervisors who tended to drive, and hence control, the piece-rate system on the shopfloor and they therefore resisted changes that acted to marginalise, if not remove, them from this key aspect of the production process; and (ii) the identification of team targets was in some cases problematic because of performance ambiguity.

In all the six companies where we conducted interviews, the opportunities for promotion were fairly limited because of the extensive delayering that occurred. At StitchCo this was compounded by external recruitment of 'knowledge experts' to help manage the change process. In the six companies, the lack of promotion opportunities was recognised as a problem and efforts were made to broaden the remuneration package by augmenting the financial rewards with non-financial 'incentives': e.g. empowerment, job rotations, broadening job boundaries, better health and safety procedures, employee training and enhancing employee loyalty (see Ezzamel et al, 1996). However, to that extent that these schemes were deemed to be effective, their 'success' is arguably as much attributable to labour market conditions as to the use of the non-financial incentives.

At Heavy Metal, shopfloor operators had no realistic chance of promotion beyond the supervisory level. From a managerial perspective, little added-value was to be gained from employees who have reached 'the end of the line', and who are perceived to have poor chances of gaining better employment elsewhere, particularly in a recessionary job market. The main incentive for these employees was the financial security of the current job and their personal pride in their work. In designing a new reward system, the emphasis was on the development of a remuneration package based upon a fixed wage that was deemed commensurate with a particular level of skill and performance supported by an 'improved' working climate that explicitly promoted better work relations, active training programmes, employee empowerment, and improved health and safety policies.

In the current recessionary economic climate, it is comparatively easy for companies to claim success as Investors in People, by publishing impressive statistics such as low employee turnover. Nevertheless, and despite the threat of unemployment, reduction in the percentage of bonus as a variable component of the total wage/salary raised anxieties among managers at Heavy Metal about the potential adverse effect on employee motivation. The development of additional dimensions in the employment package, such as better training, improved health and safety, etc. were perceived to strengthen motivation but not necessarily to deal with the problem fully[3].

Contrary to the propositions of some researchers (e.g. Barker et al, 1988), the accounts given by our interviewees suggest, if anything, the use of PRP systems based upon performance-bands more frequently at the lower, rather than middle, echelons of management. This would appear to be the case, at least for our case studies, for three reasons. First, it is comparatively easier at higher management levels to broaden the scope of job responsibilities and to render them more intellectually challenging, as the example of the finance director at Heavy Metal suggests. Those who are sufficiently ambitious may relish the added responsibilities for the purposes of internal prestige, job satisfaction, and enhancing their potential for promotion in the external labour market. Or, at least, they may be inclined to make a (macho) virtue of the necessity of adding to their work load in order to hold down their jobs.

Second, the accounts given by the managers we interviewed suggest that they value the importance of material incentives or, at least, they are reluctant to dispense with them, even when they espouse the language of empowerment and associated symbolic gratifications.

Third, despite the dysfunctional attributes of quantitative performance measures (Baker *et al*, 1988), it is at lower levels in the organisation that these measures can be most readily developed. In all six case studies it was possible to develop seemingly simple measures of performance at the shopfloor, e.g. tonnage at Heavy Metal, and also at lower management levels, e.g. sales targets in the retail side of StitchCo, but these became less concrete at higher levels in the hierarchy.

5. Conclusions

In this paper we have examined reward systems in the broader organisational setting of two companies drawn from a study based upon six companies. Our concern has been to examine the role of accounting in the development of remuneration systems that has accompanied such changes in the organisation of work as delayering and multiskilling, team working and employee empowerment. We have focused upon the extent to which accounting is implicated in the abandonment of 'old' reward structures and the promotion of 'new' ones, and the extent to which accounting contributes to the design and implementation of reward systems through which a numerical view of organisational reality is promoted. We have also explored the extent to which new initatives have been mobilised by management to buttress accounting-based reward structures in the quest for maintaining/enhancing employee motivation and coping better with the consequences of the wider changes in management practice.

Accounting is centrally involved in the constitution not only of the reward formula but also of the performance to which the formula is applied. Whether it is individual-based or group-based, the amount of reward is predominantly a product of two accounting-constituted variables: performance measure and pay rate. For all its limitations, accounting is called upon to quantify and render visible complex patterns of human performance. It is expected (by its users) to take account of discontinuities, uncertainties, and interdependencies, and somehow to generate hard data to monitor dimensions of performance.

But even when accounting's limitations in attending to these discontinuities become clear to managers, accounting remains at the centre, albeit with calls for additional supportive indicators of performance. In our case studies, accounting-based reward schemes which focused on the individual became discredited because, as one manager has suggested: 'You can't remunerate just the individual because you end up with dysfunctional decisions being taken; they could be fighting for the customer.' This then gave way to an alternative, team-based reward scheme, which was also defined through accounting calculations. Accounting defined the main performance indicators for each team, e.g. production, sales, costs, profits, and hence it influenced the selection and definition of key personal objectives; it quantified and reported achievements; and, significantly, it also constituted boundaries within each team by promoting the notion of individual influence.

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[3] Evidence from other studies also indicates that companies are seeking to evolve new scenarios to increase motivation. Zenger (1992), for example, suggests that companies tend to reward/penalise only extreme performance; very high performers are rewarded handsomely while the very lowest performers are pushed out. Such aggressive pay-for-performance contracts are seen to have the advantage of helping to retain the best performers whilst avoiding the costly alternative of rewarding the majority of employees.

In the conventional literature, reward is postulated to determine performance, as the perception of the type and level of reward provides the motivation to attain given performance levels. Yet, it is clear that under PRP systems pay is related to past performance; and hence, performance and reward could be seen to condition and mediate each other. As performance and reward each impact upon the other, conflicts and tensions are likely to arise, such as those discussed earlier. Most of the well known problems have been located in reward systems targeted at the *individual.* Our concern here is to summarise some of the PRP problems in teamworking suggested by our analysis.

First, PRP systems remain in vogue, but in our companies the fixed proportion of the total wage is now much higher than previously, as there is a move away from piece-rate systems to skill-band systems. This is consistent with a concern to avoid the dysfunctions of piece-work systems (see Baker et al, 1988). In the case of our six companies, this shift in practice has been supported if not prompted, we have argued, by a lack of growth opportunities, where the potential for internal promotions was significantly curtailed.Second, within our case studies, PRP systems were more prevalent among staff occupying positions at the lower end of corporate hierarchies compared to middle managers. This is inconsistent with the suggestion made by some researchers (e.g. Baker et al, 1988) that there is a greater tendency to reward managers, compared to shopfloor employees, on the basis of PRP schemes because, as a consequence of delayering, they have fewer chances of increasing their salaries through promotion. That said, we do not consider the value of our case study-based research to be reducible to its 'testing' of theoretical propositions. Rather, it is the capacity of contextual findings to generate insights into the dynamic practicalities of work organisation and industrial relations that is arguably of greater lasting value. Third, the shift from individual-based piece rate systems to team-based skill band systems has increased significantly the propotion of fixed wage to bonus-based pay. Given the difficulty of identifying the contribution of every individual member within a team, it is now more problematic for managers to identify and sanction individual 'slackers'. Further, the reduced bonus percentage of the total pay creates an added difficulty of motivation as pay becomes less affected by performance.

The problem of motivating the individual is increasingly becoming the responsibility of the team. Management has systematically exploited the expedience of peer pressure in the expectation that the financial imperative of the threat of reduced group pay caused by 'less cooperative' individuals will provide the necessary lubricant. The problem of motivation caused by the increase in the proportion of fixed pay has been addressed, but not necessarily overcome, by supplementing financial reward through non-financial elements such as investment in human resources (e.g. training), job enlargement and rotation, better health and safety procedures and increased 'empowerment'. Arguments and injunctions laced with terms such as 'added value to the business' and 'rewarding both skill and effort' are mobilised to promote such alternative reward schemes.

Accounting language and calculations are used to determine performance targets, whether for individuals or groups, and to quantify the skill bands for the emerging team-based reward systems. Accounting calculations are also utilised to quantify the costs and benefits of alternative reward systems in order to ensure, from the perspective of managers, that they are affordable financially.

Further, accounting intervenes in the measurement of performance, in the comparisons of actual achievements against targets, and in the determination of financial rewards. These involvements point to a potent and central role for accounting in the design and functioning of reward schemes in organisations; this, we believe, merits further examination and articulation through detailed studies of the roles of accounting language and calculation in shaping 'the new organisation' and, in turn, in being reformed by it.

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An International Comparison of Accounting-Based Payout Restrictions in the United States, United Kingdom and Germany

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Abstract—Agency theory shows that payout constraints can play an important role in debt contracting and mitigating debt-related incentive problems. In this paper, we compare how, empirically, corporations in the UK, the US and Germany are restricted in their ability to pay dividends (and other forms of payouts) to shareholders. Our study is novel in two respects: First, although there is ample evidence on the use of accounting-based payout restrictions in US debt contracts, and some evidence in the UK, there are no comparable studies on accounting-based payout constraints in German debt contracts. Second, we include debt contracts as well as regulation on dividends in the comparison to highlight the interdependencies between mandated and contractual payout restrictions. Despite marked institutional differences between the US, the UK and Germany, our comparison demonstrates that corporations are restricted in a similar fashion in all three countries. This holds for the shape of the dividend restrictions based on accounting numbers as well as some key accounting principles determining net earnings and other accounting numbers used in payout restrictions. We find that differences mainly exist with regard to the origin of the restrictions. In Germany, dividend restrictions are predominantly mandated; in the UK, mandated restrictions are supplemented by debt covenants. In the US, dividend restrictions follow primarily from debt contracting. By integrating contractual provisions as well as regulation on dividends, our comparison provides additional insights into the debt contracting process and offers a more complete picture than previous studies.

1. Introduction

Agency theory maintains that dividend restrictions can play an important role in mitigating debt-related incentives problems. Empirical studies document for the US, the UK, Australia and Canada that dividend restrictions (of any kind) are in fact frequently used in public and private debt contracts and that the contracting practice differs across countries.[1] To our knowledge, there are no comparable studies for Continental European countries. Anecdotal evidence suggests that debt covenants in general are not as common. Traditionally in Continental Europe, dividends and other forms of payouts to shareholders are restricted by law, for instance, the commercial code. The empirical studies cited above give little attention to dividend regulation. However, legal dividend restrictions and other aspects of the institutional setting (e.g. common versus code law) may be important in understanding dividend restrictions in debt contracts and helpful in explaining differences in the contracting practice across countries.

In this paper, we compare how corporations in the US, the UK and Germany are restricted in their ability to pay dividends to shareholders.[2] Unlike prior studies, we look at both legal and contractual dividend restrictions to obtain a more complete picture. The US and the UK are chosen for our comparison because several empirical studies document marked differences. Germany is chosen as an example for the Continental European countries. Since comparable studies of private or public debt contracts do not exist for Germany and the required data sets are not readily

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[1] See for the US, Smith and Warner (1979), Kalay (1982), Leftwich (1983), Healy and Palepu (1990), El-Gazzar and Pastena (1990 and 1991), for the UK, Citron (1992 and 1995), Day and Taylor (1995a, 1995b, 1996a, 1996b and 1997), for Australia, Whittred and Zimmer (1986), and for Canada, Thornton (1992).

[2] Unless stated otherwise, we use the term 'dividends' for all forms of payouts or distributions to shareholders (e.g. share repurchases) with the exception of stock dividends.

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available, we study public debt contracts and conduct interviews with several banks on their contracting practice with regard to dividend restrictions.

Overall, elaborate restrictions similar to those in the US or the UK are rarely found. However, German corporations face detailed dividend restrictions mandated by the commercial code and corporate law. Taking regulation on dividends into account, we find that cross-country differences in the restrictions become less pronounced. In each country, debt contracts appear to complement regulation so that overall the dividend problem is solved in a remarkably similar fashion. Comparing the interdependencies between legal and contractual dividend restrictions across countries provides new insights into the contracting process and is helpful in understanding the observed international differences. Prior studies have, to our knowledge, either focused on bilaterally comparing debt contracts (e.g. Whittred and Zimmer, 1986; Citron, 1992; Day and Taylor, 1995b) or dividend regulation (e.g., Augustin, 1994; Wüstermann, 1996) and for that matter highlight the differences more than the similarities.[3]

Another aspect of our study is that debt covenants and dividend regulation are often specified in accounting terms. Hence, the financial accounting system plays an important role in restricting dividends to shareholders. In Germany, the calculation of net earnings is geared towards restricting dividends and protecting debtholders and can be generally characterised as fairly 'conservative'. Although financial acounting in the US and the UK is generally characterised as more 'investor-oriented' and less 'conservative', dividend restrictions in debt contracts are still based primarily on published accounting numbers.

Given the marked differences in the accounting systems in the countries under consideration, we also compare how accounting numbers referred to in the debt contracts are determined. Previous studies document that in US private debt agreements, accounting numbers according to GAAP are frequently modified (Leftwich, 1983; El-Gazzar and Pastena, 1990 and 1991). Watts and Zimmerman (1986: 214) point out that all of these modifications are consistent with conservatism. Hence, the link between conservative accounting and the use of net earnings to restrict dividends is not only apparent in the accounting regulation of many Continental European countries, but also prevalent in US debt contracting. In particular, our international comparison reveals similarities in the set of accounting principles used for restricting dividends. We hasten to add that the accounting-principles, nevertheless, may have different meanings or may be interpreted quite differently across the countries, so that further and more detailed research is warranted in the future. In summary, taking into account both legal and contractual dividend restrictions, we identify elements that do not vary from country to country or seem to be specific to the institutional setting. It appears to us that institutional differences drive *where* the restrictions are found and the 'dividend problem' is solved and not so much *how*.

In Section 2, we briefly summarise important theoretical results in the extant literature and formulate our hypotheses. Sections 3 and 5 describe for each country the regulation on dividends and the empirical evidence on dividend restrictions in debt contracts. We then compare in Section 6 the findings and discuss the interdependencies of regulation and debt contracting. Section 7 concludes the paper.

2. Theoretical background

Dividend restrictions have primarily been analysed in the context of principal-agent theory (Smith and Warner, 1979; John and Kalay, 1982; Ewert, 1986; Hartmann-Wendels, 1991; Gjesdal and Antle, 1996; Leuz 1996a and 1996b). We maintain the agency framework to guide our comparison and follow the literature by focusing on the relationship between shareholders and debtholders. It has been shown that this relationship is characterised by incentive conflicts which necessitate some restrictions on debt-or liquidation-financed dividends, either by restricting dividends themselves or by restricting the 'sources', i.e., the disposal of assets or issuing additional senior debt, because otherwise shareholders could leave debtholders an 'empty shell' (Black, 1976; Smith and Warner, 1979). Rational debtholders anticipate shareholders' incentives and price debt accordingly, so that it is in the interest of shareholders to provide sufficient protection to prospective debtholders if they wish to obtain risky debt. Dividend restrictions are particularly important if debt is mainly supported by future cash flows, for instance in cases where asset-backed lending, i.e., securing debt with assets, is not possible or very costly due to the nature of the assets.

Agency theory also maintains that dividend restrictions have an impact on the investment decisions of shareholders. John and Kalay (1982) show that dividend restrictions may reduce underinvestment problems by 'forcing' shareholders to invest, but similarly may induce shareholders to invest in negative net present value projects. Extending their model, Ewert (1986) demonstrates that under reasonable assumptions about the financing of new projects, the incentive effects of dividend restrictions are ambiguous and depend on the specific set of assets-in-place and investment opportunities at the dividend date. Building on this result, Leuz (1996 and 1996b) argues that a contingent formulation of the upper bound on dividends is desirable and that using net earnings as a basis of the constraint facilitates specifying an upper bound that (imperfectly) corresponds with debt-related incentive problems, which may explain the widespread use of earnings-based constraints.

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[3] Leuz (1996a) provides a preliminary comparison of existing empirical studies on dividend restrictions as well as certain aspects of dividend regulation in the US, UK and Germany.

In the literature, two types of dividend restrictions, which are both stated in accounting terms, are distinguished (e.g. Kalay, 1982): A *direct* dividend constraint specifies an upper bound on dividends, for instance, based on cumulative net earnings. An *indirect* dividend constraint requires shareholders to maintain certain ratios, such as current ratio or net tangible assets to liabilities, or minimum balances, such as net worth or working capital. This imposes an upper bound on dividends, although the constraint itself does not refer to dividends. A direct dividend restriction is a so-called *negative* constraint because it can only be violated by taking a prohibited action, i.e., paying too large a dividend. An indirect constraint is called an *affirmative* constraint because it can simply be violated in the course of business without taking a prohibited action. For this reason, it has been argued that direct and indirect dividend constraints serve different purposes in debt agreements: indirect constraints are used as triggers for renegotiations of debt agreements, e.g., after an adverse change in the financial position, whereas direct restrictions primarily limit payments to shareholders (e.g. Dhaliwal, 1980).

Dividend restrictions can also have different origins. They may either be stipulated in corporate law or stated in debt agreements. Regulation on dividends has been initiated in many countries with the intention to protect creditors of firms with limited liability. In these countries, the effective upper bound on dividends can be determined only if both legal and contractual restrictions are taken into account. We hypothesise that legal restrictions are the starting point and that contractual restrictions are then chosen to complement (or undo) regulation. Since many restrictions (of whatever origin) are formulated in accounting terms referring to GAAP, the accounting system is an important determinant for both legal and contractual restrictions. For instance, if an accounting system, such as the German, is geared towards restricting dividends, we expect the contracting parties to rely more on GAAP than in a country where the main objective of the accounting system is, for example, to provide information to the capital markets.

Other aspects of the institutional setting, such as the choice of the legal system or the organisation of the capital markets, may also determine where the dividend restrictions are found. Adjusting for the differences in origin, we expect corporations to be similarly restricted in their ability to pay dividends, since in all countries essentially the same problems have to be solved.

3. Dividend restrictions in the US

3.1. Regulation

In the US, corporate distributions are regulated by state corporation law.[4] Hence, legal restrictions may differ substantially from state to state. However, there are some regularities since the Model Business Corporation Acts released by the American Bar Association's Committee on Corporate Laws have been 'very influential in shaping state laws' (Roberts et al., 1990: 41). The model acts were adopted, at least in part, by most states.[5]

State regulation replaced the common law doctrine under which dividends presuppose profits (Mason, 1932; Littleton, 1934b). McGough (1988) identifies several groups of states with respect to their regulation on corporate distributions. The largest group consists of 22 states that have statutes in accordance with the 1950 Model Business Corporation Act (MBCA). A second group of 15 states adopted the concept of legal capital central to the 1950 MBCA, but differ significantly in other respects. To this group belong Delaware, where 56% of the Fortune 500 corporations are incorporated, and New York.[6] Another group, consisting of 11 states, follows the 1984 Revised Model Business Corporation Act (RMBCA) . California uses hybrid restrictions and Massachusetts relies only on an insolvency test.[7] According to Black (1995: 1-11), the number of states following the RMBCA has increased to 29 while in the first group there are only eight and in the second only six states remaining.

Most of the states, if not all, require an equity insolvency test. That is, distributions can be made only if thereafter the corporation is able to pay its debts as they become due in the normal course of business. In determining whether the insolvency test is satisfied, the model acts require and entitle directors to exercise certain judgments about the future course of the corporation. They may, for example, perform a cash flow analysis based on business forecasts and budgets. According to the Committee on Corporate Laws, however, audited financial statements that are in accordance with GAAP and do not have a going concern qualification are sufficient.[8] In addition, all states except Massachusetts require a balance sheet test (McGough, 1988).

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[4] In addition, the Uniform Fraudulent Transfer Act may impose restrictions as its constructive fraud provisions apply to both dividends and share repurchases as well. However, these restrictions are not considered here.

[5] See Littleton (1934a) for an overview of early state regulation.

[6] See Roberts et al. (1990: 43 and note 22); Delaware Code Ann. tit. 8 170–173; New York Business Corporation Law, 510–517.

[7] California Corp. Code 500–503 and Massachusetts Gen. Laws Ann. ch. 156B, 21A and 61.

There are two distinct approaches: one adopted by the MBCA and the other adopted by the RMBCA. The MBCA employs a balance sheet test based on the concept of legal capital—that is, distributions may be paid only out of surplus defined as the excess of *net* assets over legal (or stated) capital. Surplus is then divided into earned surplus, i.e. cumulative net earnings minus prior distributions, which is generally available for distributions, and capital surplus, i.e. additional paid-in capital in excess of par value (e.g. McGough, 1988). In some states, for example, Delaware, New York and Mississippi,[9] capital surplus can also be distributed subject to certain requirements and depending on the form of the distribution. Furthermore, many state statutes allow directors to transfer stated capital in excess of par value to additional paid-in capital, or to reallocate additional paid-up capital to retained earnings (Roberts et al., 1990: 38 and 43). Besides, there is substantial discretion is defining par value (McGough, 1988).

For these reasons, the concept of legal capital is considered rather ineffective in restricting distributions and protecting creditors (e.g. Committee on Corporate Laws, 1986; McGough, 1988; Roberts et al., 1990). Consequently, the RMBCA abandoned the concept of legal capital, but retained a balance sheet test because of practical difficulties in applying the equity insolvency test: distributions (of any kind except stock dividends) are permitted only if total assets exceed the sum of total liabilities and a so-called liquidation preference on outstanding preferred stock.[10] With this restriction, par value and stated capital are no longer unavailable for distributions.

The two types of balance sheet tests do not use a particular accounting terminology, and in most states the application of GAAP is not explicitly required, except, for instance, in California (Cal. Corp. Code, 500 (b)(2)). Under the RMBCA, directors may base the balance sheet test on GAAP, fair valuation, or any other methods reasonable in the circumstances. Note that this is not a statutory enactment of GAAP. Appraisal or current values are explicitly permitted and, at least in principle, the application of GAAP does not provide a safe harbour in court (Committee on Corporate Laws, 1979 and 1986). Courts have the right to determine reasonable values themselves and in the past have chosen to deviate from GAAP.[11]. However, according to Jacqua et al. (1983: 292), 'GAAP is by far the most practical standard for the courts.' Nevertheless, the relevance of GAAP in legal restrictions remains ambiguous, as the case of asset revaluations above historical cost demonstrates; although precluded under GAAP, asset write-ups have repeatedly been used in the past to legitimise distributions that otherwise would not have been possible.

In the 1980s, asset revaluations have been important to create extra-GAAP surplus in order to legitimise substantial dividend payments or share repurchases in conjunction with takeovers or restructurings (see Roberts et al. (1990: 35 and 37) citing several examples). In some of the states following the MBCA's concept of legal capital, such as Delware and New York, net assets can be determined using fair values, and gains from revaluations increase capital surplus (Roberts et al., 1990: 40; Black, 1995: 2.01 (6)). In other states, such as Illinois or Ohio, surplus from revaluations may not be used to pay cash or property dividends (Jacqua et al., 1983: 299); California permits only marketable securities to be revalued.[12]

Furthermore, some states exclude in the balance sheet tests items permitted under GAAP. For instance, Ohio prohibits the equity accounting method (Ohio Rev. Code Ann. 1701.32(A)) and California excludes 'goodwill, capitalised research and development expenses and deferred charges' in the determination of assets (Cal. Corp. Code 500(b)(1)). It is also noteworthy that most state statutes do not require consolidated financial statements; in general, parent company accounts (with or without using the equity method) are sufficient.[13]

In summary, the legal restrictions on distributions faced by a corporate differ substantially depending on the state of incorporation. In many states, legal restrictions appear to be limited in their effectiveness (see also McDaniel, 1986 and McGough, 1988). In particular, equity insolvency tests entitle directors to exercise judgements about the future that are difficult to verify ex post and the balance sheet tests provide considerable discretion with regard to asset valuation.

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[8] See Committee on Corporate Laws (1979: 1881–1882 and 1986: 262). But see also American Institute of Certified Public Accountants (1988).

[9] Del. Code Ann. tit. 8, 154 asnd 170; NY. Bus. Corp. Law, 510(c); Miss. Code Ann. 79-3-83, 73-3-85. In addition, in some states, if there is no surplus, dividends can still be paid from earnings in the current or the preceding financial year ('nimble dividends'). See, for instance, Del. Code Ann. tit. 8, 170(a)(2).

[10] RMBCA, 45. See Committee on Corporate Laws, 1979 and 1986: 259–261.

[11] See, for example, *Randall v. Bailey*, 288 N.Y. 280 (1942) and also Black (1995: 2.01(6)).

[12] See Roberts, et al., (1990: 43). See also *Berks Broadcasting Co. v. Craumer*, 356 Pa. 620, 52A.2d 571 (1947) where the court prohibited dividends from unrealised appreciation.

[13] See Jacqua et al. (1983: 295) and Committee on Corporate Laws (1979: 1884 and 1986: 264). They are explicitly stipulated in California (Cal. Corp. Code, 114).

3.2. *Debt contracts*

As documented by several empirical studies, US debt agreements contain many detailed financial covenants. Type, number and tightness of these covenants vary substantially depending on the characteristics of the debt agreement and of the borrowing firm. Fogelson (1978) and Frost and Bernard (1989) document for their samples that public debt agreements have fewer accounting-based covenants and fewer affirmative constraints than private agreements. Furthermore, accounting-based covenants are more likely to be used for firms with relatively high leverage (Press and Weintrop, 1990) and firms with relatively more assets-in-place (Skinner, 1993). El-Gazzar and Pastena (1991) provide evidence that in private debt agreements the number of restrictions increases with time to maturity, size of the loan and leverage of the borrowing firm. Tightness is negatively related to time to maturity, but increases with size and leverage.[14] Overall, the empirical findings seem broadly consistent with the theory of debt-related agency problems.

One of the most frequent constraints in US debt agreements is the direct dividend restriction. In addition, debt agreements frequently specify restrictions based on accounting numbers that indirectly imply a dividend constraint. Table 1 summarises the empirical evidence on direct and indirect dividend restrictions in US debt agreements. It shows that the vast majority of levered US firms are contractually restricted in their ability to pay dividends. The typical direct dividend constraint is based on net earnings and can be expressed as follows (Smith and Warner, 1979):

$$D_t \le \max\left\{0,\ \alpha \sum_{j=0}^{t} NE_j + \sum_{j=0}^{t} S_j - \sum_{j=0}^{t-1} D_j + F\right\} \quad (1)$$

with D_t as dividends and share repurchases in period t, α as a constant payout parameter ($0 \le \alpha \le 1$), NE_j as net earnings, S_j as proceeds from the sale of stocks in period j, and F as a fixed amount called the 'dip'. The latter is slack initially built into the restriction and allows shareholders to pay debt-and liquidation-financed dividends equal to F. The constraint is cumulative from the beginning of the debt agreement ($j = 0$) and specifies at dividend date t a reservoir of payable funds. Healy and Palepu (1990) determine in their study a median reservoir that is six to eight times as large as the current dividend level.

Indirect constraints are found in great variety. Common are minimum levels for net worth (i.e. shareholders' equity), net tangible worth or working capital, a minimum current ratio and a maximum leverage ratio defined in various ways, e.g. debt divided by net tangible assets or net assets. If these restrictions are violated the firm is in technical default.

Elaborate dividend restrictions in US debt agreements are not surprising given weak state regulations on corporate distributions. The widespread use of contractual restrictions is also in accordance with the view put forth in the Commentaries on Indentures issued by the American Bar Foundation that, in the US, 'bondholders' rights are largely a matter of contract.'[15] Comparing legal and contractual restrictions on dividends, the latter are in most cases more restrictive and hence represent the effective upper bound (e.g. Jacqua et al., 1983: 289; McGough, 1988: 337). Furthermore, accounting-based debt covenants are generally based on audited and consolidated financial statements in accordance with GAAP. This implies, for instance, that (upward) asset revaluations are prohibited, except in the context of consolidating business combinations. However, for many private and some public debt agreements, GAAP is only a starting point, that is, net earnings, liabilities and shareholders' equity under GAAP are further modified.

GAAP modifications ('tailoring') may simply imply that different definitions are used, but they may also entail that different accounting methods have to be employed. Moreover, the applicable set of accounting rules can be fixed to those in effect or actually used to prepare the financial statements at the time of contracting ('frozen GAAP') as opposed to those in effect at the dividend dates over the life of debt ('rolling GAAP'). Depending on the specification, this protects the borrowing firm from GAAP changes, but may also limit its ability to change accounting methods subsequently and even force the firm to prepare two sets of financial statements (Fogelson, 1978). According to Mohrman (1996), 'frozen' GAAP are becoming increasingly common, a fact which she attributes to increased FASB activity in recent years. In her sample, 51% of the contracts with accounting-based covenants have GAAP that are fixed in some way.

GAAP modifications were first discussed in Leftwich (1983) and subsequently studied in several papers. The findings are summarised in Table 2.

In the studies mentioned in Table 2, the most common modifications are to exclude from earnings those arising from the application of the equity method, preacquisition retained earnings picked up under the pooling-of-interest method and gains from early debt retirement, to classify guarantees and contingencies as debt, even if they are not probable, and to exclude goodwill and

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[14] See also El-Gazzar and Pastena (1990) for similar findings in a comparison of bank and insurance debt.

[15] American Bar Foundation (1971). The Commentaries are a guide for lawyers negotiating restrictive covenants.

Table 1
Overview of empirical studies on US accounting-based dividend covenants

Study	*Sample size and selection*	*Type of debt (private or public)*	*Direct dividend constraint (in % of the number of contracts)*	*Indirect dividend constraints (in % of the number of contracts)*
Smith/Warner (1979)	Commentaries and 87 contracts	public	23%	not available
Kalay (1982)	150 random contracts rated in Moody's Industrial Manual	mainly public	90%	10%
Castle (1980)	37 bank lending contracts	private	62%	Working capital: 76% Net worth: 46%
McDaniel (1986)	92 contracts of Fortune 100 firms	public	35%	not available
El-Gazzar et al. (1989)	43 contracts of intensive lessees	private	58%	25%
Duke/Hunt (1990)	187 random contracts reported in Moody's Industrial Manual	mainly public	55%	Working capital or current ratio: 35% Leverage: 28% Net (tangible) worth: 18%
Press/Weintrop (1990)	111 contracts from 83 random nonservice, nonregulated firms	public (28) and private (83)	61%	Leverage: 49% Net worth: 46% Working capital: 45% Current ratio: 22%
El-Gazzar/ Pastena (1990)	74 contracts with accounting-based covenants	private	80% (with 74% in bank lending and 95% in insurance lending)	Working capital: 84% Others: 96%
El-Gazzar/ Pastena (1991)	73 contracts with accounting-based covenants	private	74%	78% (e.g. working capital, net worth, current ratio and leverage)
Mohrmann (1996)	228 contracts from previous studies across 24 industries	public (41) and private (148 with banks and 39 with insurance firms)	50%	Net (tangible) worth: 54% Working capital or current ratio: 53%

other intangibles from the definition of net worth. Less frequent modifications concern income from foreign investments, effects of foreign currency translation and deferred taxes. The practice of specifically tailoring the accounting rules (as opposed to just curtailing GAAP earnings with a lower payout parameter α) indicates that US-GAAP are not deemed suitable for the purpose of restricting dividends under all circumstances. Moreover, the modifications are generally conservative in nature, i.e. they postpone or even permanently reduce net earnings, and hence decrease the reservoir of payable funds (Leftwich, 1983; Watts and Zimmerman, 1986: 214).

4. Dividend restrictions in the UK

4.1. Regulation on dividends

In the UK, distributions are regulated through company law complemented by case law and the articles of association of limited liability companies. The accounting literature principally differentiates between two concepts of profit: accounting profit (AP) and distributable profit (DP) (e.g., Nobes, 1982; ICAEW, 1982a; McGee and Mumford, 1988 and 1992; Pennington, 1990: 419–431; Morris, 1991). AP is defined as the difference between revenue and expenses over a period and calculated according to the accounting

Table 2
Overview of empirical evidence on GAAP modifications in US debt agreements

Study	*Number and type of contracts studied*	*Results*
Leftwich (1983)	Commentaries and 10 debt agreements	Commentaries recommend extensive GAAP modifications in private debt contracts
Frost and Bernard (1989)	18 private and public debt agreements of oil and gas firms	82% of the contracts contain at least one covenant classified as modified GAAP
El-Gazzar et al. (1989)	43 private debt agreements with intensive lessees	69% of 26 contracts with a dividend constraint tailor the definition of income 41% of 22 contracts define net worth different from shareholders' equity under GAAP.
El-Gazzar et al. (1990)	74 private debt agreements	**Bank debt**: 21% of the contracts modify GAAP income; 58% tailor the definition of net worth **Insurance debt**: All contracts modify GAAP income; 86% tailor the definition of liabilities and of net worth

standards (SSAP, FRS, pronouncements of the ASB and the ASB's Urgent Issues Task Force). AP is disclosed in a company's annual report; however, it is neither the basis for distribution nor taxation. The Companies Act (CA) 1985 (as amended by CA 1989) defines a legal upper bound on distributions, the DP.

The concept of DP has been introduced into the CA with the implementation of the Fourth European Directive on Company Law in 1980. However, the concept itself is far older; legal restrictions on dividends in the form of a capital maintenance rule can be traced back to the introduction of limited liability companies as a result of the Limited Liability Act 1855 (e.g. Reiter, 1926; French, 1977; McGee and Mumford, 1988). To protect creditors as well as shareholders, companies were 'prohibited from paying dividends in excess of the surplus of net assets over the amount of the paid-up capital of the company', i.e. dividends could only be paid out of profits so that the shareholders' funds remained undiminished (French, 1977: 306). The capital maintenance doctrine was weakened when, in 1867, the CA allowed a company to reduce its share capital under specified circumstances. As a result of the alleged incapability of the capital maintenance doctrine to sufficiently protect creditors and potential problems due to forced (over-) investment (French, 1977: 315), the strict capital maintenance rule was abandoned by 1889. It was superseded by a solvency test more geared towards creditor protection (French, 1977: 319). Case law generally did not prohibit a company from paying dividends out of unrealised profit (e.g., in the case of *Dimbula Valley (Ceylon) Tea Co. Ltd. vs. Laurie*, 1961) as long as a company stayed solvent (Schmitthoff, 1976: 804; Instone, 1985: 107).

At present, CA 1985 Section 263 (1) states that a 'company shall not make a distribution except out of profits available for this purpose'. A definition of the term 'distribution' is provided in a subsequent paragraph. It represents every kind of 'distribution of a company's assets to its members, whether in cash or otherwise', except for share redemptions, capital reductions, asset distributions on the winding up of a company and stock dividends. CA 1985 Part V Chapter VII restricts in general the repurchase or redemption of shares by a public company; it may repurchase or redeem shares only if it complies with the restrictions set forth in Sections 162 to 168. The amount used to purchase or redeem shares as well as potential premiums and administrative expenses have to be paid out of DP.[16] Thus, these rules complement the dividend restriction of Section 263 (1)–(3). On the contrary, stock dividends may be affected without using DP.

The payout constraint in CA 1985 can be written as

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[16] Private limited companies may redeem or repurchase shares out of capital if they comply with the regulations set forth in CA 1985 Sections 171 to 177. In this case, no distributable profit is consumed.

$$D_t \leq \max\left\{0, \sum_{i=\tau}^{t} NRP_i - \sum_{i=\tau}^{t-1} D_i - \sum_{i=\tau}^{t} RUP_i\right\} \quad (2)$$

with D_t as dividends, share repurchases and redemptions in period t, NRP_i as net 'realised' (accounting) profit, RUP_i as realised, but undistributable (accounting) profit in period i, and where $i = \tau$ and $i = T^*$ refer to the corporation's foundation and liquidation, respectively. To facilitate our later comparison, we rewrite the above constraint as follows:

$$D_t \leq \max\left\{0, \alpha \sum_{j=0}^{t} NE_j - \sum_{j=0}^{t-1} D_j + F\right\} \quad (3)$$

with $\alpha = 1$ as a constant payout parameter, NE_j as net *distributable* earnings (or DP) in period j, and F ('dip') as the sum of (accumulated) distributable reserves at $j = 0$. Note that $NE_j = NRP_j - RUP_j$. The constraint expresses the legal upper bound on distributions during the life of a (hypothetical) debt contract starting at $j = 0$ and maturing at $j = T$ (see Figure 1).

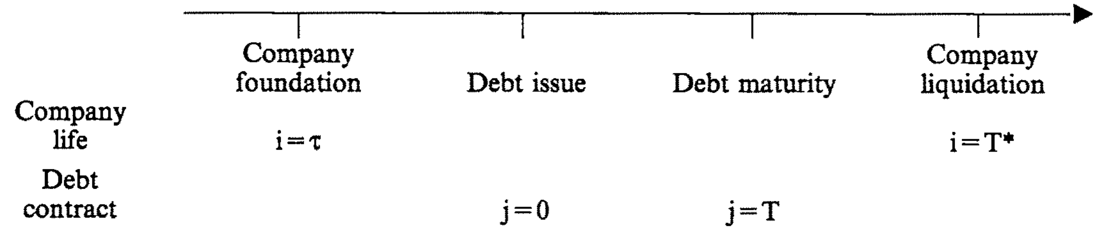
In principle, DP is determined by adjusting AP with regard to profits that are realised, but considered undistributable. These items comprise the term RUP_j. This step is necessary because different concepts of realisation are employed in CA 1985 and in the accounting standards. That is, although it is common to interpret CA 1985 Section 256 (1) as referring to the ASB's accounting standards and other authoritative pronouncements, a situation can arise where profits that are realised according to some accounting standard are considered undistributable, even though CA Section 263 (3) states that realised profits are distributable.

Thus, although there is agreement in the UK that the underlying concepts of realisation for AP and DP differ, it is unclear precisely which adjustments have to be made to AP to arrive at DP. This is a matter of some controversy in the British accounting literature. In particular, there exist different views with regard to the realisation of profits in the cases of marketable securities, development costs and foreign currency translation (e.g., Nobes, 1982; Keenan, 1985; McGee and Mumford, 1988). For instance, it is not decided whether accounting profits through the revaluation of marketable securities can be treated as distributable as they are in fact *not* realised but merely realisable. According to the ASB *realisable* profits nevertheless are classified as realised and shown in the profit and loss account. Development costs may be recognised as an asset in the balance sheet if certain criteria specified in SSAP 13, paragraph 25 are fulfilled (ICAEW, 1982b; Keenan, 1985).

However, with respect to DP, research and development expenses must be regarded as *realised* losses and a recognition of development costs would need to be reversed in order to calculate DP.[17] According to SSAP 20, foreign currency translation gains are to be included in the profit and loss account and thus represent 'realised' accounting profit due to the ASB's invocation of the true and fair view override. However, in the literature translation gains are regarded as 'unrealised' for distributional purposes, and therefore are not seen to be free for distributions to shareholders (e.g. Nobes, 1982; Woolf, 1983; Morris, 1991).

A precise definition of DP can neither be obtained in the CA nor in British accounting standards. The ICAEW (1982a and 1982b) in its Guidance Statements left the question of profit realisation for distribution unanswered. Due to these controversies in the British financial accounting literature (e.g. Carsberg and Noke, 1989; McGee and Mumford, 1988 and 1992) as well as the literature on company law (e.g. Instone, 1985; Noke, 1989), the practical relevance of DP is difficult to judge. The missing definition may have led to insecurity and difficulties in the enforcement of

Figure 1
Time sequence of events



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[17] If SSAP 13 could directly be applied when calculating DP, the explicit provisions in CA 1985 Section 269 would not have been necessary (Anderson, 1985). Nevertheless, TR482 (ICAEW 1982b: paragraph 23) does not consider development costs recognised in the balance sheet as realised losses.

the DP rules.[18] Furthermore, to our knowledge, there are no recent court decisions that could clarify that DP in fact represents an upper bound on distributions. Statements about DP are regularly based on common law built up during the early twentieth century. A transfer of these court decisions, which in most cases were addressing tax issues, to the current situation is difficult even though they may in principle represent binding precedents (Pennington, 1990: 421; Morris, 1991). The concept's ambiguous legal foundation may be one reason for the lack of recent court cases.[19]

Last but not least, CA 1985 does not specifically require directors to disclose the DP in the financial statements (Mumford, 1995: 952). Consequently, shareholders (as well as researchers) do not know the corporation's DP and whether it complies with the rules in calculating DP. The ICAEW Guidance Statement (ICAEW, 1982a: paragraph 15) requires a disclosure of DP only if it is necessary to give a true and fair view of a company's status, e.g., in case there are material non-distributable profits shown in the profit and loss or other reserve accounts. In general, DP is not disclosed in British annual reports. This could imply that the concept is of little relevance in practice or that no material divergence between AP and DP exists.

To get some idea, in May 1997 we sent a short questionnaire to three Big Six auditing firms in the UK asking about the concept's relevance in accounting and auditing practice. The three respondents indicate that DP is relevant and of concern to the auditors, but acknowledge difficulties with its determination.

Public limited liability companies are further restricted in their ability to make distributions to shareholders. CA 1985 Section 264 (1) states that 'a company may only make a distribution at any time (a) if at that time the amount of its net assets is not less than the aggregate of its called-up share capital and undistributable reserves, and (b) if, and to the extent that, the distribution does not reduce the amount of those assets to less than that aggregate'.

In this context, Section 264 (2) defines net assets as the aggregate of a company's assets less the aggregate of its liabilities (including any provisions for liabilities or charges within paragraph 89 of Schedule 4). Section 264 (3) defines a public company's undistributable reserves as its share premium account, the capital redemption reserve, the excess of accumulated 'unrealised' profits over accumulated 'unrealised' losses so far as not previously written off in a reduction or reorganisation of its share capital, and other reserves restricted by the company's constitutional documents. The payout constraint of CA Section 264 (1) can be written as $D_t \leq \max \{0, NW_t - SC_t - UR_t\}$ with NW_t as net worth, SC_t as share capital and UR_t as undistributable reserves in period t. This direct dividend constraint is negative, just like the dividend restriction contained in CA Section 263 (1): companies are not required to pay negative dividends (i.e., issue new equity) in order to comply with legal regulations. In general, the direct dividend constraint in CA 1985 Section 263 (1) provides the effective upper bound on dividends, except in the unusual case where the above mentioned 'unrealised' losses are greater than 'unrealised' profits (e.g. in the case of revaluation deficits) where the constraint in CA Section 264 (1) may be tighter (Anderson, 1985; Bird and Morris, 1987; Pennington, 1990: 423–424).

In summary, British accounting literature differentiates between two profit concepts: accounting and distributable profit. As described above, for DP a more conservative realisation concept is considered appropriate, although its definition remains somewhat ambiguous.

4.2. Debt contracts

Several empirical studies have analysed the use of accounting-based debt covenants in British debt contracts (Citron, 1992 and 1995; Day and Taylor, 1995b, 1996a, 1996b and 1997). Their principal finding is that debt covenants are mostly standardised in their formulation. The specifics of each debt agreement seem to be primarily taken into account when setting the values in the covenants. Financial covenants are prominent in long term cash-flow lending and generally accompanied by more stringent variable values than in asset-backed, i.e., secured lending, where covenants are only used infrequently. In addition, Citron (1995) finds that fewer covenants are used in public (versus private) debt agreements which is in line with US findings and the hypothesis of costly renegotiation in Smith and Warner (1979). Surprisingly, and in contrast to US studies, he does not find a positive relationship between gearing and the number of debt covenants.

Direct dividend constraints are usually not included in British public or private debt contracts. Exceptions occur in debt contracts with private limited companies, MBOs, special purpose financing, and where significant uncertainties exist (e.g. Burgess, 1985: 83; Day and Taylor, 1995a and 1995b; Citron, Robbie and Wright, 1997). Indirect dividend constraints requiring the borrowing firm to maintain a minimal (tangible) net worth or maximum gearing or leverage are a frequent feature of British public as well as private debt contracts (Citron, 1992 and 1995; Day and Taylor, 1995b and 1996b).

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[18] McGee and Mumford (1992) point out further difficulties when the DP concept is applied to groups. While intra-group transactions cancel out in the group accounts, they lead to distributable profit in the individual accounts. So, DP can be generated between group members.

[19] McGee and Mumford (1992) find that in practice it probably is easier to sue directors on the ground of their failure to serve the best interest of their company when paying excessive dividends.

Net worth is defined in accounting terms as the aggregate of paid-up share capital, specific reserves (e.g. share premium, capital redemption) as well as the accumulated profit and loss account. Usually, at least some intangible assets, such as goodwill, and brands, as well as tax provisions and revaluation reserves, are excluded from the calculation of net worth. However, certain intangibles may explicitly be included in the net worth figure if the debtholders are able to judge their value (Citron, 1992). Net worth constraints limit liquidation-financed as well as debt-financed dividends. Gearing is defined as the relation of total borrowings to tangible net worth, where borrowing is regularly explicitly specified as including items such as guarantees, leases or intra-group borrowings. Thus, off-balance sheet financing schemes are included when calculating balance sheet ratios. Leverage differs from gearing in so far as it sets total liabilities in relation to total assets. Both ratio covenants indirectly restrict dividends.[20]

Thus, debtholders often define explicitly the accounting rules used to calculate numerator and/or denominator of balance sheet ratios restricting dividends. This is the case although current GAAP (i.e. 'rolling GAAP', see Citron (1992), Day and Taylor (1995a and 1996b)) and audited financial statements are recognised as a general basis for accounting-based covenants. Given the effort spent on defining components of accounting aggregates such as net worth or borrowing, surprisingly little tailoring of accounting rules occurs with respect to the profit figure itself (Citron, 1992). The lack of a precise profit definition in the contract as well as a direct constraint (or a reference to AP or DP) is intriguing to us. It may be interpreted as evidence that the DP concept satisfies debtholders in so far as the additional transaction costs of extensively tailoring the profit figure are not warranted.

In the literature, the apparent lack of direct dividend constraints in British debt covenants is dealt with only in passing. For instance, Day and Taylor (1995b) speculate that bankers do not want to intrude too far into the directors' sphere, thus taking up the role of 'shadow directors'.[21] Overall, bankers seem to be satisfied with the dividend restricting effect of the regularly used indirect dividend constraints (Citron, 1992; Day and Taylor, 1995b). Common non-accounting-based dividend constraints such as restrictions on share redemptions or asset disposals are viewed as complementing accounting-based restrictions (Citron, 1992: footnote

Table 3
Overview of empirical studies on UK accounting-based dividend covenants

Study	*Sample size and selection*	*Type of debt (private or public)*	*Direct dividend constraint (in % of the number of contracts)*	*Indirect dividend constraint (in % of the number of contracts)*
Citron (1992)	22 bank lending contracts and contract templates	private	0% (except after covenant breaches)	Net worth: 82% Gearing/Leverage: 73%/ 13%
Citron (1995)	108 debt contracts from Extel's Record of Takeovers, Offers and New Issues	public	0 %	Gearing/Leverage: 27% Asset disposal: 17%
Day/Taylor (1995a)	interviews, debt contracts/samples of 18 financial institutions	private	0% (except for private companies, MBOs, special-purpose lending)	Net worth: 67% Gearing/Leverage: 72%
Day/Taylor (1996a)	interviews with 44 corporate treasurers of major UK companies	private	7% (under special circumstances, e.g. exploration, oil/gas companies)	Net worth: 70% Gearing: 88%

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[20] See Citron (1992) for a closer analysis of ratio definitions.

[21] They are referring to CA 1985 Section 741 (2). Note that a negative dividend constraint may represent only a minor intrusion into a company's affairs compared to frequently appearing affirmative ratio covenants. While the former only prohibits certain behaviour, the latter forces explicit actions on behalf of the management in order to avoid technical default.

10). However, a potential effect of the DP concept is not explicitly addressed.

A different explanation is put forth in this paper. We conjecture that the lack of direct dividend constraints is a consequence of CA regulation on profit distribution and capital maintenance. Since the DP concept generally implies a dividend restriction which automatically protects every debt contract, additional dividend covenants may only be necessary in so far as to complement or substitute inadequate legal restrictions. The use of direct dividend constraints is especially important in the case of private limited companies, when a company's financial position is weak or when conflicts of interest are apparent.

5. Dividend restrictions in Germany

5.1. Regulation

In Germany, corporate law imposes restrictions on dividends to shareholders. In this section, we describe the legal dividend restrictions for the stock corporation (*Aktiengesellschaft*, AG) and the limited liability company (*Gesellschaft mit beschränkter Haftung*, GmbH), which are the two most important legal forms for corporations in Germany.[22]

The Stock Corporation Act (*Aktiengesetz*, AktG) in conjunction with the Commercial Code (*Handelsgesetzbuch*, HGB) stipulates a direct dividend constraint. According to 150 and 233 AktG, the upper bound on dividends is equal to the so-called free reserves (i.e., retained earnings) plus the current profit adjusted for any profits or losses carried forward minus any mandatory or statutory increases of the reserves.[23] Stock corporations have to retain 5% of their current profit in the so-called legal reserves unless the additional paid-in capital and the legal reserve account for at least 10% of the subscribed capital. Payouts not in the form of dividends are even more severely restricted for German stock corporations. Distributions out of subscribed capital and additional paid-in capital are explicitly prohibited (57 (1) and 230 AktG). Subscribed capital may be reduced (*ordentliche Kapitalherabsetzung*) only if creditors are given the option to demand additional collateral (225 AktG). Share repurchases are not common because they are allowed only under exceptional circumstances (71 AktG), for instance to grant shares to employees (see also Rosen and Helm, 1996). Repurchased shares held by the corporation have to be capitalised at acquisition costs and shown under current assets. In addition, an undistributable reserve for these repurchased shares has to be set up (71 (2) AktG and 272 (4) HGB).

For any dividend date t, the legal dividend constraint for German stock corporations can be written as

$$D_t \leq \max\left\{0,\ \alpha\, NE_t + RE_t^d\right\} \qquad (4)$$

with D_t as dividends (defined to be the sum of cash dividends, share repurchases and other payouts to shareholders), NE_t as net earnings, α as payout parameter ($\alpha = 0{,}95$ or 1 depending on the size of the legal reserves) and RE_t^d as distributable reserves (including adjustments for profit or losses carried forward). To facilitate our later comparison, we rewrite this constraint such that it states the upper bound on dividends at any dividend date t during the life of a (hypothetical) debt contract:

$$D_t \leq \max\left\{0,\ \alpha \sum_{j=0}^{t} NE_j - \sum_{j=0}^{t-1} D_j + F\right\} \qquad (5)$$

with $j = 0$ as debt issue date, $j = T$ as debt maturity,[24] and F as a fixed amount equal to all distributable reserves at the debt issue date adjusted for any profits or losses carried forward.[25] These reserves are equivalent to the 'dip' in US constraints in the sense that they provide slack in the restriction allowing shareholders to pay liquidation- or debt-financed dividends equal to F. The constraint is negative and cumulative, i.e., retained earnings can be paid out at a later date.

The Limited Liability Company Act (*Gesetz betreffend die Gesellschaften mit beschränkter Haftung*, GmbHG) also defines a direct dividend constraint in conjunction with the Commercial Code (HGB). This constraint has in principle the same structure as the constraint for joint stock corporations. According to 30 GmbHG, the upper bound on dividends of a limited liability company is equal to the reserves plus the current profit adjusted for any profits or losses carried forward (see also Ordelheide and Pfaff, 1994: 73). Again, payouts not in the form of dividends are restricted, although not as severely as for stock corporations. Distributions to shareholders out of subscribed capital are prohibited. In contrast to stock corporations, 30 GmbHG permits distributions out of additional paid-in capital and does not require a legal reserve to be built up from profits. Share repurchases are allowed if certain conditions are met (33 GmbHG), but as for stock corporations an undistributable reserve for repurchased shares held by the corporation has to be set up (33 (2) GmbHG and 272 (4) HGB).

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[22] See Ordelheide and Pfaff (1994: 23–34), Deutsche Bundesbank (1997: 28–31) and for a comparison with the UK Edwards and Fischer (1994: 71–88).

[23] For more details see Bitz et al. (1986: 195).

[24] See also Figure 1 in the UK section.

[25] Due to this reformulation, further adjustments may be necessary to account for stock dividends. They reduce the upper bound given by the term in brackets as the subscribed capital is not available for distributions.

Both legal dividend restrictions are stated in accounting terms. They refer to individual and not to group accounts. Due to this link, there is a strong emphasis on the determination of a *distributable* profit and in turn on the prudence principle in German accounting regulation. Financial accounting rules are set by the legislature and stated in the Commercial Code (*Handelsgesetzbuch*, HGB). They are complemented by court decisions as well as commentaries by scholars and auditors. Financial statements prepared according to these rules are then used in the aforementioned constraints. In fact, restricting dividends and 'preventing any erosion of the nominal capital through a conservative determination of profit' are among the primary objectives of the accounting rules pertaining to the individual accounts (Ballwieser, 1995: 1,419). Recognition criteria and valuation rules are strongly influenced by this objective.[26] Historically, the goal of protecting creditors has been one of the main driving forces behind German accounting and dividend regulation.

5.2. Debt contracts

In Germany, debt is the most prominent external source of finance and bank debt is the most important form of debt. We therefore study dividend restrictions in bank debt contracts. Corporate bonds are now practically extinct in Germany (Ordelheide and Pfaff, 1994: 36–39). However, German parent companies often use foreign capital service subsidiaries to raise public debt abroad. Since these public debt contracts are generally guaranteed by the German parent, we include them in our analysis. We also study private debt contracts with insurance companies. Although this form of debt is of minor importance in Germany, these contracts are relevant in our context since the use of accounting-based restrictions is generally recommended for them.

In the literature, there are only a few papers addressing accounting-based covenants in German bank debt contracts, albeit with a different focus from ours (Obermüller, 1987: 134–135, Thießen, 1996; Wittig, 1996). They indicate that accounting-based covenants are still rarely used in Germany, but do not provide any explicit evidence on the frequency. Since bank debt contracts are not publicly available, we conducted semi-structured interviews with eight banks lending to industry, four of the largest German banks, a bank specialised in lending to industry and three US banks operating in Germany, to empirically assess the importance and frequency of financial and in particular accounting-based covenants.[27]

Three of the banks interviewed already account for a market share of more than 17%, measured in terms of balance sheet totals of all German banks.[28] The rationale for including US banks in the sample is to see whether their contracting practice in Germany is different from the practice of German banks given that accounting-based covenants are common in US debt agreements. Based on the results reported below, we feel that our interviews provide a comprehensive picture of German contracting practice with respect to dividend restrictions and that an analysis of the actual agreements would not add much to our study.

The main result is that none of the banks uses a direct dividend constraint in their debt contracts with corporations. All banks include indirect *accounting-based* covenants only in the context of, for instance, management buy-outs, structured and project financing or when the borrower has a low credit rating, but not in their standard debt agreements. In the former cases, minimum net worth, leverage or minimum cash flow constraints are negotiated. The contracts generally do not tailor German GAAP. Overall, the answers received suggest a uniform practice with respect to dividend constraint.

Given the US and UK evidence, the lack of accounting-based and in particular direct dividend constraints in most German bank debt contracts may seem surprising. Considering, however, that all corporations face a direct dividend constraint stipulated by corporate law, a contractual constraint may be superfluous. Thus, we interpret our findings as evidence that German legal restrictions sufficiently restrict dividends and other forms of payouts. To further 'test' this hypothesis, we asked in our interviews whether legal dividend constraints and capital maintenance requirements are explicitly taken into account when formulating the debt contract and whether they are considered sufficient. All but one German bank indicate that they view the legal constraints as sufficient in conjunction with other provisions and instruments used. Interestingly, two of the three US banks also view the legal dividend constraints for corporations as sufficient.[29] Overall, the answers of US bankers are consistent with the answers provided by German bankers.

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[26] See Ballwieser (1995: 1,401 and 1,477) for further references.

[27] The interviewees were promised anonymity. Therefore, their names are not provided in this paper. The interviews took place between December 1996 and May 1997.

[28] The calculation is based on data provided in Edwards and Fischer (1994: 108).

[29] The third US bank interviewed does not engage in standard debt agreements with German corporations. They primarily participate in syndicated international loans for which US or UK contracts are used.

We further asked whether the debt covenants for corporations are different from those for unincorporated firms. The logic behind this question is that German corporations face the legal dividend constraint described whereas unincorporated firms do not.[30] This difference in legal dividend restrictions may impact on contracting practice despite differences in legal liability between corporations and unincorporated firms. In fact, all the German banks in our sample indicate that for unincorporated firms some form of payout constraint (*Darlehensbelassungserklärung* and *Kommanditrevers*) is usually negotiated in the debt agreement (for *Kommanditrevers* see Obermüller, 1987: 61–71); the US banks interviewed do not lend to unincorporated firms. These findings are consistent with the hypothesis that legal restrictions for corporations are in fact relevant and that contractual constraints are chosen to complement legal ones.

One alternative interpretation for the apparent lack of dividend constraints in Germany is that the contracting parties foresee problems with German accounting numbers, e.g. because they are too discretionary due to hidden reserves, and hence refrain from using them to formulate covenants. However, we find no indication for this hypothesis in the answers received. The contracting practice with unincorporated firms suggests the opposite. Even the US banks lending to German corporations assert the relevance of the legal constraints. Furthermore, German accounting numbers are used to formulate contractual restraints in specialised debt agreements (e.g. project financing).

The lack of accounting-based covenants in German bank debt agreements also has to be considered within the context of alternative instruments used to secure debt. German banks frequently use *non-accounting-based* provisions to protect their debt agreements, e.g. collateral, negative pledge clauses or project tying of funds,[31] of which collateral seems to be the most important item.[32] Another important peculiarity of the German bank debt agreements is the General Terms and Conditions (*Allgemeine Geschäftsbedingungen*, AGB) which generally form the basis of every *bank* debt agreement (Jährig and Schuck, 1990: 95; Rudolph, 1978: 1026–1028).

The AGB issued by the association of German banks are *identical* from bank to bank and specify covenants that apply to every individual contract. Section 13 (1) of the AGB gives the bank a general right to demand collateral. Section 13 (2) states that the bank has this right at any time during the life of the contract after an adverse change in the financial situation of the borrower. If the bank demands additional collateral in this situation which is not granted by the borrower, Section 19 (3) stipulates that the bank has the right to call the debt. Moreover, if the deterioration of the borrower's financial situation is material, the bank always has the right to call the debt (AGB Section 19 (3); Häuser, 1995). Indicators for a material adverse change that are accepted in court are, for example, a significant decrease in shareholders' equity or in liquidity, or when a loss is reported for successive years. (Gössmann et al., 1993: 1/243; Wittig, 1996).

As a consequence of the AGB, German banks do not have to negotiate financial covenants to have a trigger for renegotiations. However, accounting-based covenants would enable the bank to precisely specify the trigger, i.e., what constitutes a material adverse change in the financial situation of the borrower. But if such a change occurs and it is not picked up by the covenants, the bank has no longer the rights laid down in the General Terms and Conditions (Wittig, 1996).

Clearly, there is a trade-off. Problems may especially occur when the borrower already has a bad financial standing at the time of debt issue. In these cases, it might be difficult to define the occurrence of a material adverse change (in the sense of the AGB) and financial covenants might be advantageous. Our interviewees indicate that accounting-based covenants are in fact negotiated in these exceptional cases. The conjecture that the AGB substitute for *indirect* (or affirmative) accounting-based covenants was largely confirmed in the interviews, although there may be other reasons why financial covenants are not yet as prevalent in Germany (Thießen, 1996). This feature of German bank debt contracts does not explain the lack of *direct* dividend constraints.

It should be mentioned that there are other peculiarities of the German universal banking system such as equity participations by banks, their representation on boards and the proxy voting system (Mayer and Alexander, 1990; Ordelheide and Pfaff, 1994: 44) that might mitigate debt-related incentive problems and hence reduce the need for contractual dividend constraints in Germany.

We also studied a sample of public debt contracts. Since German firms rarely issue public debt we include foreign capital service subsidiaries of German parent companies in our sample.[33] It includes 19 prospectuses from 1986 to 1992. The debt contracts studied account for approximately 8% of the total number of public debt issues over this six-year period.[34] Our sample comprises two bonds of German corporations, 15 of foreign subsidiaries of German corporations and two of subsidiaries of unincorporated German firms. The first 17 bonds are randomly selected. The last two bonds are to our knowledge the only two cases where subsidiaries of unincorporated German firms issued public debt over the period analysed and are chosen because unincorporated firms do not face a legal direct dividend constraint.

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[30] Although dividends are restricted for unincorporated firms (121 HGB) as well, the 'subscribed capital' can be reduced at any time by mutual consent of the equityholders (122 (2) HGB). Hence, an effective legal payout constraint does not exist.

[31] See Rudolph (1985), Oelschläger (1971: 114), Jährig and Schuck (1990: 100).

[32] For example, Edwards and Fischer (1994) state that '...in the 1980s, almost all long-term bank loans, and nearly 70% (by loan volume) of short-and medium-term bank loans, were made on a collateralized basis.'

[33] All foreign subsidiaries in our sample are Dutch, although the sample is selected randomly. The Netherlands are chosen

We do not find any *accounting-based* restrictions in the debt contracts of foreign subsidiaries of German *corporations*. However, there are non-accounting-based provisions, such as negative pledge, pari-passu and cross-default clauses (applying to both the subsidiary and the parent company) and guarantees of the parent company, in all debt agreements. The two contracts of German corporations (No. 8 and 11 in Table 4) also have negative pledge clauses, but in addition contain financial ratio covenants and restrictions on the disposal of assets.

The subsidiaries of *unincorporated* firms have essentially the same non-accounting-based covenants. In one agreement, we find a constraint directly restricting dividends to shareholders of the parent company (No. 18 in Table 4). This finding is in line with our expectations given that the unincorporated parent company does not face a legal constraint. The evidence summarised in Table 4 further supports the conjecture that legal direct dividend constraints for German corporations substitute for contractual dividend constraints commonly found in other countries. As for the bank debt contracts, we find that *non*-accounting-based covenants are frequently used in public debt contracts while accounting-based covenants are rare.

An exception to this rule are (private) debt contracts with insurance lenders (*Schuldscheindarlehen*). Parts of the funds raised by insurance companies are invested by lending to other businesses. These investments of insurance companies are regulated by the Supervision of Insurance Companies Act (*Versicherungsaufsichtsgesetz*, VAG) with the objective to protect the funds of insured parties. Generally, debt has to be secured by land charge. If debt cannot be secured by land charge, then according to a recommendation issued by the association of German insurance companies (Bald et. al., 1994) a negative pledge clause and the following accounting-based covenants should be negotiated: minimum return on total investment, debt-to-cash flow ratio and debt-to-equity ratio. Furthermore, some specific definitions are provided: e.g., off-balance sheet items are included and pension liabilities are excluded from total debt, but accounting rules themselves are not tailored. Note that a direct dividend constraint is not stipulated. This again confirms the results reported for bank and public debt agreements.

Our results can be summarised as follows: all corporations face a legal direct dividend constraint in Germany. Hence, we find no direct dividend constraints in debt agreements with corporations. Indirect dividend constraints are used only in specific cash-based debt agreements and if the lender is an insurance company. For standard bank debt contracts, the General Terms and Conditions (AGB) provide a similar trigger for renegotiation as accounting-based covenants. For debt contracts with unincorporated firms, a direct dividend constraint is sometimes negotiated as these firms do not face effective legal dividend constraints.

6. International comparison

Agency theory maintains that dividend constraints are used in order to reduce debt-related incentive conflicts. Considering that these incentive problems are likely to be prevalent to some degree in all countries, we are not surprised to find various dividend restrictions in the US, the UK and Germany.[35] It is perhaps more surprising that these restrictions are quite similar. However, this becomes apparent only if legal as well as contractual restrictions are included in the comparison. In all countries, distributions are limited irrespective of whether they are made in the form of cash dividends, share repurchases or capital reductions. Furthermore, we find that in all three countries corporations face a *direct* dividend constraint—although of different origin—and that the shape of this constraint is very similar (see Figure 2). That is, the direct restriction is based on net earnings and stated as a cumulative and negative constraint.[36]

A (minor) difference arises with respect to the treatment of *new* equity issues (i.e. after $j=0$), which increase the reservoir of payable funds only in the US. This follows from the fact that the British and the German constraints are specified for

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by the German parent companies for several reasons (e.g. taxes). See Ammelung and Schneider (1996).

[34] Sample selection and calculations are based on data provided by Deutsche Finanzdatenbank (DFDB), Aachen-Karlsruhe-Mannheim.

[35] However, as mentioned in Section 5.2, country-specific features of the governance structure may reduce the need for contractual dividend constraints.

[36] In the UK and Germany, legal restrictions refer to net earnings in the individual accounts, whereas in the US contractual restrictions are generally based on group accounts. Note also that considerable differences may arise depending on how net earnings are calculated. This is discussed further below.

Table 4
Sample of public debt agreements

	Subsidiaries of German corporations	*Year/Mill DEM*	*Debt covenants*
01	Lufthansa International Finance N.V., Curacao, Dutch Antills	1986/750	negative pledge clause of subsidiary / negative pledge clause, guarantee of Deutsche Lufthansa AG
02	Daimler-Benz International Finance B.V., Utrecht, Netherlands	1986/500	negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, guarantee of Daimler-Benz AG
03	Heraeus International Finance B.V., Wijk bij Duurstede, Netherlands	1986/75	negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, guarantee of Heraeus Holding GmbH
04	Metallgesellschaft Finance B.V., Amsterdam, Netherlands	1986/150	pari passu clause, negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, guarantee of Metallgesellschaft AG
05	Wella International Finance B.V., Amsterdam, Netherlands	1986/130	cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Wella AG
06	Degussa International Finance N.V., Amsterdam, Netherlands	1987/200	negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, guarantee, cross-default-clause of Degussa AG
07	Hoesch International Finance B.V., Haarlem, Netherlands	1987/150	negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, guarantee, cross-default-clause of Hoesch AG
08	**Viag AG, Berlin/Bonn, Germany**	1987/150	restrictions on the disposal of assets, **maintenance of several financial ratios**, negative pledge clause of Viag AG
09	Wella International Finance B.V., Amsterdam, Netherlands	1988/50	pari passu clause, cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Wella AG
10	Dräger Finance B.V., Zoetermeer, Netherlands	1988/70	pari passu clause, cross-default-clause, negative pledge clause of subsidiary / negative pledge clause, guarantee of Drägerwerk AG
11	**Fuchs Petrolub AG, Mannheim, Germany**	1988/30	restrictions on the disposal of assets, **maintenance of financial ratios (e.g. leverage)**, negative pledge clause of Fuchs Petrolub AG
12	Volkswagen International Finance N.V., Amsterdam, Netherlands	1989/200	cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Volkswagen AG
13	Feldmühle Finance B.V., Gennep, Netherlands	1989/200	negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, cross-default-clause, guarantee of Feldmühle AG
14	Volkswagen International Finance N.V., Amsterdam, Netherlands	1989/300	cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Volkswagen AG
15	Daimler-Benz Interational Finance B.V., Utrecht, Netherlands	1990/200	cross-default-clause, negative pledge clause of subsidiary / negative pledge clause, guarantee of Daimler-Benz AG
16	Spar Internationale Financiering B.V., Amsterdam, Netherlands	1991/90	pari passu clause, negative pledge clause, cross-default-clause of subsidiary / negative pledge clause, cross-default-clause, guarantee of Spar-Handels-AG
17	Kaufhof Plus Finance B.V., Amsterdam, Netherlands	1992/200	pari passu clause, cross-default-clause, negative pledge clause of subsidiary / negative pledge clause, guarantee of Kaufhof Holding AG
Subsidiaries of German unincorporated firms:			
18	Trumpf Finance N.V., Amsterdam, Netherlands	1988/50	pari passu clause, cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Trumpf GmbH & Co. KG and **direct divided constraint for Trumpf GmbH & Co. KG**[38]
19	Würth Finance International B.V., Amsterdam, Netherlands	1990/100	cross-default-clause, negative pledge clause of subsidiary / cross-default-clause, negative pledge clause, guarantee of Adolf Würth GmbH & Co. KG

[38] This direct dividend constraint refers to the parent company. When equity is less than 20% of total assets, payouts to shareholders are restricted.

Figure 2
Components of direct dividend constraints

USA/UK/Germany	USA	USA/UK/Germany
$D_t \le \max\left\{0,\ \alpha \sum_{j=0}^{t} NE_j\right.$	$+\sum_{j=0}^{t} S_j$	$\left.-\sum_{j=0}^{t-1} D_j + F\right\}$

any point in time of the corporation's life. That is, the constraints do not refer to a particular debt contract and thus can make no distinction between proceeds from issuing equity before or after a specific debt issue.

Similarly, the dip F has a different interpretation depending on the time horizon of the constraint. Due to our reformulation of the legal constraints in the UK and Germany (see Sections 4.1 and 5.1), the dip is equal to the sum of distributable reserves at the time of debt contracting, whereas in the US the dip is a constant amount specified in the debt contract. Whether this in fact is a (material) difference depends on the size of the corporation's retained earnings at the time of debt contracting in comparison to the typical dip in US contracts. Kalay (1982: 216) reports that the size of the dip ranges from 0 to 8.7 times annual earnings while the mean is slightly greater than annual earnings.

The main differences in our comparison arise with respect to the origin of the constraint. In the US, the effective direct dividend constraint is generally found in a debt contract while the legal constraints are weak and incoherent. In contrast, in the UK and Germany, corporate law stipulates a constraint while no direct constraint is used in debt contracting. This pattern suggests that contractual restrictions complement legal restrictions. This conjecture is further supported by the observation of *contractual* dividend constraints for *unincorporated* firms in Germany, for which there is no legal direct constraint, and for *private limited* companies in the UK, for which only a weak form of capital maintenance is required.

This observation is in contrast to German and British contracting practice with *corporations*. We find that direct dividend constraints are included in debt contracts whenever legal constraints are weak or missing, as in the US or for unincorporated firms in the UK and Germany. Thus, the comparison suggests that the contracting parties in the UK and Germany view the *legal* direct constraints stipulated for corporations as sufficiently restricting dividends. This is noteworthy, as indirect dividend constraints, which may in principle further tighten the upper bound on dividends, are allegedly used in contracts for a different purpose. For all three countries, it is claimed that the indirect restrictions are included to provide an early warning signal and trigger for renegotiations, which also explains why they are described as *affirmative* constraints (Dhaliwal, 1980; Day and Taylor, 1995a; Wittig, 1996).

Comparing the evidence on indirect accounting-based constraints, we find that they are a common feature of US debt contracts and frequently used in British debt contracts. In both countries, the number of indirect constraints is lower for public (versus private) debt, short term (versus long term) debt and asset-backed (versus cash flow) lending. In Germany, indirect dividend restrictions are rarely used in standard debt agreements, which are often asset-backed, but are found in specific financing arrangements (e.g., MBOs).[37] However, there are contractual provisions in Germany that give similar rights to debtholders as indirect dividend constraints. The General Terms and Conditions (AGB) used in (almost) every German bank debt contract can be viewed as substitutes for accounting-based covenants specifying ratios and minimum balances. For instance, as discussed in Section 5.2, the AGB provide a trigger for renegotiating a bank debt contract analogous to an indirect dividend constraint in the US and UK. Thus, in all countries, firms face a negative constraint directly restricting dividends and affirmative constraints providing a trigger for renegotiation. Table 5 summarises our comparison and indicates where the effective accounting-based constraints are found.

In principle, direct and indirect restrictions are based on accounting numbers determined according to the generally accepted accounting principles (GAAP) of the respective country. This set of rules may then be adapted either by the regulator (UK and California) or by the contracting parties (UK and US) for the purpose of determining the upper bound on dividends. The tailoring is less pronounced in UK debt contracts. There, however, the law provides a direct constraint that refers with the DP to a profit concept that differs from the published accounting profit in some important re-

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[37] Similarly, Citron et al. (1997: 283) report that covenants are more frequently used in MBO lending in the UK.

Table 5
Comparison of accounting-based payout constraints for corporations across countries

		UK		*USA*		*Germany*	
Dividend constraint		*Direct*	*Indirect*	*Direct*	*Indirect*	*Direct*	*Indirect*
Regulation		●		[1]		●	
Debt contracts	Private		●	●	●		[2]
	Public		●	●	●		

[1] various restrictions in state law exist, but are less generally binding than contractual restrictions
[2] except for MBOs, MBIs, project financing and insurance company debt as well as not specifically accounting-based constraints in the General Terms and Conditions of bank debt

spects. So some sort of tailoring for the purpose of restricting dividends already occurs on the level of legal restrictions (as in California; see Section 3.1).

It is remarkable that tailoring of accounting numbers is particularly found in the US and the UK, which allegedly have more investor-oriented and less conservative accounting systems. In Germany, where financial accounting is primarily geared towards the prudent calculation of a distributable profit that is then used to specify a legal upper bound on dividends, there are no direct dividend constraints and (consequently) no modifications of GAAP in debt contracts. In those rare cases where there are indirect dividend constraints in Germany, tailoring is infrequent and limited to specifically and narrowly defining the numerator and denominator of accounting ratios. The modifications of GAAP in the US and UK may prescribe the use of different accounting rules as well as specific definitions for accounting ratios. Frequent modifications in private debt contracts are to exclude intangibles and goodwill from the calculation of net worth (or shareholders' equity), to extend the use of provisions for contingent losses and to prohibit the use of the equity method and asset revaluations above historical cost.

These contractual modifications, the exclusion of goodwill, capitalised research and development expenses and deferred charges under California Corp. Code 500 (b)(1) as well as the use of the DP in the UK generally lead to a tighter upper bound on dividends and hence can be characterised as conservative. Under German GAAP, the distributable profit is prudently calculated in the individual accounts and involves excluding self-generated intangibles, using an extensive definition for contingencies and prohibiting the equity method of accounting for associates as well as asset revaluation above historical cost.

These accounting principles seem to be universally of concern when restricting dividends, i.e. determining a distributable profit. Thus, at the level considered, the similarities in calculating an upper bound on dividends are remarkable. We do not suggest, however, that there are no differences in the way (distributable) profit is calculated in each country. In fact, at a more in-depth level, there are still marked differences—for instance, in the underlying concepts of realisation, but this issue is left to future research.

7. Conclusions and suggestions for future research

In this paper, we study legal and contractual dividend restrictions in the US, UK and Germany. Our comparison documents interdependencies between regulation and contracting processes and highlights several similarities and differences in the dividend restrictions imposed on corporations in these countries. Given the substantial differences in the institutional frameworks, the similarities found are perhaps more surprising than the differences.

In all three countries, corporations face direct dividend constraints that are similar in their structure, e.g. earnings-based, but different in their origin. In the US, direct dividend constraints are mainly contractual, in the UK indirect contractual restrictions complement the legal direct dividend constraints and in Germany direct dividend constraints are almost exclusively legal. This comparison suggests a complementary relationship between legal and contractual dividend constraints for all three countries. Furthermore, legal and contractual dividend constraints in all three countries are generally based on GAAP, although the rules and accounting numbers are sometimes modified by the constraints. Interestingly, the number and extent of the modifications are particularly pronounced for those accounting systems that are generally characterised as more investor-oriented and less conservative.

Finally, several caveats are in order: In the UK, the role of DP needs to be further investigated in order to better understand whether it is in fact complementary to dividend restrictions in debt contracts. Although the banks interviewed comprise more than 17% of the balance sheet totals of all German banks, and the public debt agreements analysed account for 8% of all public debt issues over a six-year period, our findings for Germany are based on samples that are small in absolute number due to data limitations. It should be kept in mind that we only use our results to establish the widespread lack of accounting-based and, in particular, direct dividend constraints in Germany.

Future research could extend our comparison to other countries, in particular other continental European countries. It is also be interesting to see whether recent and future changes in the German and other European accounting systems towards more investor-oriented financial reporting will lead to more contractual restrictions as our comparison suggests. Accounting systems throughout the world are moving away from the notion of a distributable profit for published financial statements. For instance, equity valuation in the individual accounts and mark-to-market valuation are part of a larger development towards more investor-oriented accounting systems. The problem restricting dividends, which was especially important in the early stages of accrual accounting in Europe as well as the US and the development of conservatism, seems to be pushed from financial accounting into debt contracting. The determination of an upper bound on dividends is increasingly left to the contracting parties. As this development continues, we expect to see more contractual constraints restricting dividends and more tailoring of GAAP in the future. First signs of this development can be seen in the growing discussion of financial covenants in the German literature, although not yet for the purpose of restricting dividends.

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The Determinants of Managerial Accounting Policy Choice: Further Evidence for the UK

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Abstract—This paper combines an accruals-based measure of accounting discretion with a multivariate modelling framework as a means of generating more appropriately specified tests of the determinants of managerial accounting policy choice. Findings suggest that smoothing considerations account for the majority of cross-sectional variation in the degree of accounting discretion. Evidence is also presented that managers employ accounting choices to (i) signal expected future cash flow performance and (ii) reduce the probability of debt covenant violation, as captured by the leverage ratio. However, the strength of the relation between leverage and accounting policy choice is shown to vary across the sample period, possibly reflecting changes in the probability of debt contract violation for the average sample firm over time. Limited evidence is also presented which suggests that the magnitude of the association between discretionary accruals activity and leverage, ownership, and smoothing may be conditional on prior-period accrual activity.

1. Introduction

This paper explores the determinants of managerial accounting discretion for a large sample of UK industrial firms in contrasting periods of economic performance. Accounting policy choice and its role in management's external reporting strategy is a central issue in financial reporting. However, despite considerable effort, the fundamental determinants of accounting policy choice have proved difficult to isolate. Commenting on the failure of prior work to document consistent results, Foster (1986) suggests that poorly specified tests may be partly responsible. Two acknowledged sources of misspecification in prior work stem from (i) the measurement of accounting discretion and (ii) correlated omitted variables. This study aims to present additional evidence as to the determinants of managerial accounting discretion by combining an accrual-based measure of accounting choice with a multivariate modelling approach in an attempt to improve the specification of the empirical model.

Early work directed at identifying the determinants of accounting policy choice employed multivariate techniques to explain individual accounting method choices in terms of a range of firm specific characteristics.[1] While this approach allows for interactions between competing demands on management's accounting discretion, the failure of individual methods to adequately reflect the complete set of accounting choices available to management results in a test of relatively low power (Watts and Zimmerman (1990)). Recognising that managers possess a range of techniques for increasing (decreasing) reported income, Healy (1985) used total accruals as a proxy for accounting choice on the grounds that accruals aggregate into a single measure the net effect of numerous accounting policies. Following Healy (1985), contemporary studies have employed accruals-based measures of accounting discretion as a means of improving the specification of the accounting choice proxy (e.g. DeFond and Jiambalvo, 1994; Holthausen, Larcker and Sloan, 1995; Perry and Williams, 1994). In general, however, these studies have adopted a univariate modelling approach. Consequently, unless the event under consideration represents the fundamental determinant of accruals activity, this approach will also yield misspecified tests due to the omission of important explanatory variables.

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[1] See Holthausen and Leftwich (1983) and Watts and Zimmerman (1986) for a comprehensive review of this literature.

Building on the results of prior work, this study models the cross-sectional variation in discretionary accrual activity as a function of three accounting choice motivations; costly contracting (proxied by leverage and managerial equity ownership); income smoothing (measured as non-discretionary earnings relative to target earnings); and information signalling (proxied by the magnitude of current period investment expenditure). Consistent with contemporary accounting choice research, discretionary accruals are estimated using a variant of the regression-based expectations procedure proposed by Jones (1991). In contrast to prior work, however, this study also controls for documented sources of measurement error in estimated discretionary accruals as a means of further improving the specification of the empirical tests.

Findings indicate that smoothing considerations account for the majority of cross-sectional variation in the degree of accounting discretion. Evidence is also presented that managers employ their accounting discretion as a means of (i) signalling expected increases in future cash flows, and (ii) reducing the probability of debt covenant violation. However, the strength of the relation between the empirical proxy for debt covenant violation and discretionary accruals is shown to vary across different estimation periods, possibly reflecting time series changes in the probability of financial distress for the average sample firm. A striking feature of the results is the relatively poor explanatory power of the costly contracting variables as a group.

While improved model specification represents a primary objective of the study, the paper contributes to existing work in a number of additional respects. First, unlike prior accrual-based tests which employ highly idiosyncratic samples, the present focus is broad in nature, thereby addressing concerns over the general credibility of UK financial statement data (e.g. Cadbury Report, 1992). Secondly, the cross-sectional analysis is conducted for contrasting periods of economic performance in order to assess possible time series variation in the incentives underlying accounting choice. Finally, the sensitivity of the findings to the self-reversing property of accounting accruals is examined.

The remainder of the paper is organised as follows: Section 2 discusses the potential determinants of accounting policy choice; Section 3 describes the measurement of accounting discretion, while Section 4 provides details of sample selection procedures and variable measurement. Empirical results are reported in Section 5 and Section 6 concludes the paper.

2. Hypotheses

In this study, managers are assumed to face a range of competing incentives for accounting discretion, with the sign and magnitude of their final choice reflecting a trade-off between the costs and benefits associated with each alternative. For convenience, the following discussion groups these competing motivations into three broad categories: costly contracting theories; income smoothing; and information signalling.[2]

2.1. Costly contracting theories

The role of accounting numbers in firms' contractual arrangements (both implicit and explicit) provides one incentive for managers to exercise their accounting discretion. For example, Smith and Warner (1979) discuss the use of accounting numbers in debt contracts as a means of restricting wealth transfers between shareholders and bondholders. As firms approach their accounting-based debt covenant restrictions, managers are hypothesised to employ income-increasing accounting choices to circumvent or delay costly contractual violation. Using the gearing ratio as a proxy for the probability of debt contract violation, the debt-equity hypothesis predicts that accounting choice is positively associated with leverage.

Accounting numbers are also commonly employed in managerial compensation contracts (Healy, 1985). When managerial wealth is tied directly to reported earnings, managers are hypothesised to employ accounting procedures that shift reported earnings from future to current periods in an attempt to maximise their current period income (Watts and Zimmerman, 1986). The compensation hypothesis predicts a positive association between accounting choice and the existence of an earnings-based bonus plan.[3] Since detailed compensation plan data are difficult to obtain, a number of prior studies have exploited the negative association between managerial equity ownership and the probability of an earnings-based bonus plan and tested the related hypothesis that accounting choice is negatively associated with the level of managerial equity ownership (Niehaus, 1989; Dempsey, Hunt and Schroeder, 1993).[4]

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[2] These groupings have been adopted merely to simplify the discussion and are not meant to represent mutually exclusive categories. In reality, there is likely to exist considerable overlap between these groupings. For example, the rationale for income smoothing has been attributed to managerial attempts to signal the permanent component of earnings (Chaney and Lewis, 1994; Subramanyan, 1996). Similarly, Holthausen (1990) discusses the information signalling hypothesis within a costly contracting framework.

[3] Healy (1985) demonstrates that, as a result of upper and lower bounds on the level of earnings-related bonuses payable to management, the relation between accounting choice and the level of reported earnings is non-linear. I explore this issue in Section 5.3. of the paper.

Watts and Zimmerman (1986) discuss how accounting numbers indirectly affect the extent to which a firm is criticised or supported by consumers, employees and politicians. As a result, managers of politically visible firms are predicted to favour income-decreasing accounting choices as a means of affecting the probability of taxes being imposed or subsidies being granted.[5] Extant empirical tests have employed size as a crude proxy for political visibility on the assumption that large firms attract greater media attention and have relatively large wealth transfers imposed on them. The size hypothesis predicts a negative association between accounting choice and firm size. However, as Christie (1990) discusses, the size hypothesis is problematic to the extent that firm size may proxy for a range of additional (unspecified) factors. Therefore, while a measure of firm size is employed in the subsequent tests, its inclusion is motivated as a means of controlling for the well-established correlation between size and accounting choice (Watts and Zimmerman, 1990), rather than as a direct attempt to test the political cost hypothesis.

2.2. Income smoothing

As an alternative to the costly contracting theories, the income-smoothing hypothesis predicts that managerial accounting choice is driven by the desire to minimise volatility in the reported income stream. A number of possible explanations have been proposed to justify management's preference for a stable earnings number. For example, Ronen and Sadan (1981) suggest that managerial incentives to maximise compensation may underlie income smoothing. More recently, Chaney and Lewis (1994) and Easton and Zmijewski (1989) argue that smoothed earnings allow shareholders to better assess the permanent component of current earnings. Alternatively, Trueman and Titman (1988) motivate income smoothing on the grounds that it leads claimholders to perceive lower cash flow volatility, thereby lowering the firm's cost of capital. A consistent theme throughout these studies, however, is the basic prediction that managers smooth earnings towards some pre-determined target level. The income smoothing hypothesis predicts income-increasing (decreasing) accounting choices when pre-discretionary earnings are below (above) target earnings.

2.3. Signalling

Holthausen (1990) argues that if managers have a comparative advantage in providing firm-specific information, one would expect them to be compensated in part on the basis of their ability to provide information about the firm's future cash flows. Assuming that management possesses (i) superior knowledge regarding future cash flows and (ii) powerful incentives to communicate that knowledge to uninformed parties, the information signalling hypothesis predicts that managers make accounting choices to reveal their expectations regarding the firm's future cash flow stream. Subramanyam (1996) provides evidence consistent with the notion that managers employ their accounting discretion to signal future performance.

One situation likely to satisfy both preconditions for information signalling is during periods of heavy investment expenditure. Investment in plant and equipment, R&D, market share, etc., often increases future income at the expense of current earnings performance (Murphy and Zimmerman, 1993; Stein, 1989). Since reduced current period reported earnings increase the likelihood of managerial replacement (Weisbach, 1988), managers engaged in large-scale investment programmes are hypothesised to face powerful incentives to signal expected future cash flow benefits by selecting income-increasing accounting procedures in the current period. The investment spending hypothesis therefore predicts that accounting choice is positively related to the magnitude of current period investment expenditure.[6]

3. Discretionary accruals

3.1. Estimating discretionary accruals

Consistent with contemporary accounting choice studies, this paper employs an accruals-based proxy for accounting discretion. Total accruals in period *t* are defined as the difference between earnings before extraordinary items and cash flow from operations. Since the time period employed in this study pre-dates FRS 1: *Cash Flow Statements*, total accruals are measured using the indirect algorithm method (Drtina and Largay, 1985). Specifically, total accruals are defined as the change in non-cash current assets minus the change in current liabilities (exclusive of the current portion of long term debt), less the depreciation charge.[7]

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[4] An alternative theoretical argument supporting a negative association between accounting choice and managerial equity ownership is rooted in the managerial economics literature and is based on the view that managers face powerful incentives to report accounting income in the most favourable way in order to reduce the probability of removal, either by shareholder vote or takeover (Demsetz, 1983). Empirical evidence suggests that the removal of an incumbent manager is negatively related to managerial equity ownership (Shivdasani, 1993), leading to the prediction of a negative association between accounting choice and managerial equity ownership.

[5] As Holthausen and Leftwich (1983) discuss, the link between political visibility and accounting numbers is the most tentative of all the economic consequence explanations because the linkage does not depend on any explicit contract to which the firm is a party.

[6] The validity of the investment spending hypothesis depends crucially on the assumption that management is undertaking positive NPV projects. With no way of isolating the impact of investment expenditure on positive NPV projects, the present form of the signalling hypothesis is unable to distinguish between instances of 'truthful' signalling and cases where managers pursuing shareholder wealth-decreasing investments (e.g. as a result of 'empire building') attempt to replicate this strategy in order to achieve the associated payoffs (e.g. higher current period compensation, increased job security, etc.).

Following Healy (1985), total accruals may be decomposed into discretionary and non-discretionary elements. Since neither component is observable directly, tests of managerial accounting choice require the use of a proxy for the discretionary component of total accruals. Of the range of available techniques, prior research indicates that a regression-based expectations model of the form proposed by Jones (1991) yields the most efficient discretionary accruals estimate (Guay, Kothari and Watts, 1996; Young, 1996). Accordingly, the following analysis employs a measure of discretionary accruals computed using a variant of the Jones (1991) procedure.

A significant problem with the approach as operationalised by Jones (1991) is that it requires a substantial time series of observations for each sample firm in order to estimate the model of non-discretionary accruals. As a result, concerns of survivorship bias naturally arise. As a means of mitigating this problem, DeFond and Jiambalvo (1994) employ a cross-sectional version of the Jones (1991) model.[8] This is the approach employed in the present study. Specifically, for each industry represented in the final sample, level-two FT-SE industry-year portfolios are constructed, based on all available firm-year observations contained on *Datastream*. Industry-year non-discretionary accrual parameters are derived by estimating the following regression for each industry-year portfolio:

$$TA_{ijt}/S_{ijt-1} = \alpha_{jt}/S_{ijt-1} + \beta_{1jt}\Delta \mathrm{Rev}_{ijt}/S_{ijt-1} + \beta_{2jt}PPE_{ijt}/S_{ijt-1} + \varepsilon_{ijt} \quad (1)$$

where

TA = total accruals;
Δ = change in revenue over the period t-l to t;
PPE = gross property, plant and equipment;
S = total sales (104);
$i = 1, \ldots, I$ industries contained in the sample;
$j = 1, \ldots, J_i$ estimation firm index for the number of firms in industry i at time t;
t = sample period(s).

OLS regression is used to obtain estimates a_{it}, b_{1it} *and* b_{2it} of c_{it}, β_{1it} and β_{2it}, respectively. *PPE* and Δ*Rev* are designed to control for the non-discretionary component of total accruals. All variables are scaled by lagged sales to control for heteroskedasticity. The mean number of firms in the industry portfolios for 1988 (1991) is 39.40 (42.96).[9] Using the appropriate industry-year parameter estimates, discretionary accruals (*DA*) for sample firm *j* in period *t* are computed as:[10]

$$DA_{jt} = TA_{ijt}/S_{ijt-1} - [a_{jt}/S_{ijt-1} + b_{1jt}\Delta \mathrm{Rev}_{ijt}/S_{ijt-1} + b_{2jt}PPE_{ijt}/S_{ijt-1}] \quad (2)$$

3.2. *Measurement error*

Extant studies employing discretionary accruals have been conducted under the maintained hypothesis that total accruals can be correctly decomposed into discretionary and non-discretionary elements. Recent work by Dechow et al. (1995) and Young (1996) suggests that discretionary accrual proxies contain systematic measurement error when cash flows are extreme. Additionally, Young (1996) provides evidence that accruals-based measures of accounting choice are mechanically related to firms' asset structure via the depreciation charge. To control for potential misspecification in the dependent variable, measures of cash flow and asset structure are employed in multivariate tests.

4. Data and empirical proxies

4.1. *Sample and data*

The study employs a cross-sectional research design. Inferences based on any cross-sectional study of accounting choice will lack generalisability if the incentives underlying accounting discretion vary through time. *A priori*, there exists a strong possibility that certain empirical associations will indeed be time dependent. For example, if accounting choice is a function of the probability of debt contract violation, then all else equal, one would expect to observe a stronger cross-sectional association between income-increasing accounting choices and leverage during periods of economic recession (when the average probability of default is high), relative to periods of strong economic growth. To mitigate this problem, cross-sectional tests are conducted for the same set of firms in different time periods. The sample years 1988 and 1991 are employed as a means of capturing contrasting periods of economic performance.[11]

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[7] Datastream items [Δ(376–375) – Δ(389–387)] – (402–562), where Δ signifies the change from period *t-1* to *t*.

[8] An additional benefit of a cross-sectional specification is that it does not require the assumption of a stationary association between non-discretionary accruals and the explanatory variables through time.

[9] Engineering contains the largest number of firms in each year (141 in 1988 and 142 in 1991) while extractive contains the least (six in both estimation periods).

[10] Generally, extant work using the Jones model has used total assets as the deflator in regressions (1) and (2). In contrast, this study employs sales as the deflator to minimise the possibility of estimated discretionary accruals being mechanically related to the investment spending variable. Holthausen et al. (1995: footnote 14) note that for their tests, the choice of either assets or sales as the deflator has no substantive impact on the results. Consistent with prior work employing the Jones (1991) model, the median estimated coefficient on Δ*Rev* in equation (1) is negative while that on *PPE* is positive and significant.

The sample is drawn from UK quoted industrial and commercial firms contained on *Datastream*. Candidates for inclusion in the sample are required to have:

(i) financial statement data available on *Datastream* for both 1988 and 1991;

(ii) 1988 and 1991 annual reports available at Manchester Business School;

iii) a minimum of five additional firms (with available financial statement data) in the same level-two FT-SE industry group.[12]

The final sample consists of 533 firms from 25 level-four industries.[13] Tests suggest that the research design has succeeded in isolating contrasting periods of economic performance: median earnings scaled by lagged sales are 0.057 for 1988, compared with 0.033 for 1991. Similarly, 1988 median sales growth is 0.187 compared to −0.010 in 1991 (both differences significant at the 0.0001 level using a paired Wilcoxon test).

4.2. Empirical proxies

Accounting choice is proxied using discretionary accruals, measured as prediction errors derived from the cross-sectional expectations procedure detailed in Section 3. The explanatory variables used to test the six accounting choice predictions are defined as follows:

- *Costly contracting hypotheses*: Leverage (*Lev*) is measured as the ratio of total assets to total borrowings, while managerial equity ownership (*Own*) is defined as number of shares (beneficial and non-beneficial) with full voting rights held by directors, divided by the total voting shares outstanding.
- *Income smoothing hypothesis*: Income smoothing (*Smooth*) is defined as the difference between non-discretionary earnings and target earnings where non-discretionary earnings at time *t* are measured as earnings minus discretionary accruals (Guay, Kothari and Watts, 1996), and target earnings are measured as median industry earnings at *t-1*.[14] Based on this, a binary variable is defined, taking the value of one if non-discretionary earnings are above target earnings, and zero otherwise.
- *Signalling hypothesis*: Investment expenditure (*Invest*) for firm *i* is measured as growth in tangible fixed assets plus R&D expenditure for the period, less the median level of investment expenditure for its industry.

Firm size (*Size*) is defined as the logarithm of end of period sales and is used to control for the well-documented correlation between size and accounting choice.[15] Operating cash flow (*CFO*) and asset structure are used to control for potential measurement error in the accounting choice proxy. *CFO* is measured as earnings before extraordinary items minus total accruals. Since measurement error is predicted to be greatest for firms with extreme cash flow performance, two binary control variables are defined: CFO_L equals one if firm cash flow is contained in the lowest decile of the operating cash flow distribution, and zero otherwise; similarly CFO_H equals one if firm cash flow is contained in the highest decile of the operating cash flow distribution, and zero otherwise.

Following Young (1996), asset structure is proxied using both fixed asset intensity (*Int*), measured as the ratio of gross fixed assets to total market capitalisation, and average asset life (*Life*), measured as the ratio of gross fixed assets to the depreciation charge.

5. Empirical results

5.1. Descriptive statistics and univariate tests

Descriptive statistics for all variables are presented in panel *A* of Table 1, while Panel *B* presents Spearman correlations for the explanatory variables. Significant associations are observed between *Size* and *Lev*, *Size* and *Own*, and *Lev* and *Smooth*. For the univariate analysis, sample firms are partitioned according to the sign of the discretionary accrual. Median values for each continuous explanatory variable are then compared

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[11] *The Economist* (July 25, 1992) provides evidence that the peak of the economic boom in the UK occurred towards the end of 1988. By contrast, the UK economy experienced seven successive quarters of decline between the third quarter of 1990 and first quarter of 1992 (*The Economist*, August 22, 1992).

[12] Criteria *(i)* and *(ii)* allow the collection of financial statement data and managerial equity ownership information, respectively. The final filter ensures that industry-year portfolios used to calculate non-discretionary accruals contained a sufficient number of firms to enable equation (1) to be estimated. DeFond and Jiambalvo (1994) also employ a minimum of six firms in their industry-year portfolios.

[13] 1,014 firms were covered by *Datastream* in both 1988 and 1991. Of these, 109 are omitted due to filter *(i)*, 363 due to filter *(ii)*, and nine due to filter *(iii)*. Tests indicate that firms in the final sample are significantly larger than those in the initial sample ($p = 0.003$ for a two-tailed Wilcoxon test) and report higher earnings ($p = 0.02$). In contrast, no difference in leverage was evident between the two groups ($p = 0.36$).

[14] DeFond and Park (1996) define target earnings as average industry earnings in period *t*. This approach was not employed due to the potential for hindsight bias.

[15] Log sales were used to correct for the highly skewed nature of the sales distribution. Additional specifications also employed log market capitalisation. Results were unchanged from those reported in the text.

Table 1
Descriptive statistics and sample correlations. Sample equals 533

Panel A: Descriptive statistics

1988

	Mean	Median	Std	Skewness	Kurtosis	$p(W>0)$*
DA	−0.0042	0.0001	0.0931	−2.2177	8.1922	0.0001
Size	11.2774	11.0676	1.8024	0.4061	−0.0927	0.0001
Lev	0.1467	0.1304	0.1103	0.9870	2.5320	0.0001
Own	0.1037	0.0675	0.2459	0.8772	−0.3235	0.0001
Invest	0.2081	0.0002	1.3271	11.0326	142.6253	0.0001

1991

	Mean	Median	Std	Skewness	Kurtois	$p(W>0)$*
DA	−0.0063	−0.0008	0.0895	−6.9240	6.1782	0.0001
Size	11.5498	11.3220	1.7982	0.3033	0.0542	0.0001
Lev	0.1993	0.1800	0.1986	7.1694	88.0474	0.0001
Own	0.0877	0.0519	0.1964	1.4213	1.1880	0.0001
Invest	0.0270	0.0001	0.2341	4.0197	37.0851	0.0001

Panel B: Spearman correlations for 1988 (1991)

	Size	*Lev*	*Own*	*Smooth*
Lev	0.169[a]			
	(−0.018)[a]			
Own	−0.453[a]	−0.040		
	(−0.450)[a]	(0.022)		
Smooth	0.022	−0.184[a]	0.001	
	(0.063)	(−0.161)[a]	(−0.025)	
Invest	−0.048	0.067	0.012	−0.074
	(−0.018)	(−0.185)	(0.005)	(0.007)

[a] Significant at $p>0.01$
*Shapiro-Wilke test for normality

DA = discretionary accruals, computed using the cross sectional Jones model
Size = logarithm of end of period sales, measured in millions
Lev = total assets/total liabilities
Own = directors' equity ownership (beneficial and non-beneficial)/total voting shares outstanding
Smooth = 1 if pre-discretionary earnings are greater than target earnings, 0 otherwise
Invest = growth in tangible assets plus R&D expenditure for the period, less industry median

across alternative accrual portfolio using a one-tailed Mann-Whitney test.

Findings reported in Table 2 provide evidence consistent with the leverage and signalling hypotheses in both sample periods ($p<0.05$). No support for the managerial ownership hypotheses is documented, although for both sample periods, differences in portfolio medians are in the predicted direction. Income smoothing is assessed using a chi-square test. Significant differences are documented in both periods ($p<0.001$), providing strong support for the income smoothing hypothesis.[16]

5.2. Multivariate analysis

To simultaneously test the significance of the determinants of accounting choice, a multivariate regression framework is employed. Table 1, panel A, documents evidence of outliers in the discretionary accruals distribution for both sample years. Estimators from an OLS regression are therefore likely to be extremely sample-dependent, as the fat-tailed error distribution associated with these extreme observations invalidates the Gauss-Markov theorem (Taylor, 1974). Consequently, an estimator that attributes relatively little weight to outlying observations is clearly preferred. Iman and Conover (1979) present evidence that estimators from a rank-transform regression are robust to outliers.

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[16] For 1988, 20 (295) firms with negative discretionary accruals have pre-discretionary earnings below (above) target earnings compared with 185 (33) of those with positive discretionary accruals firms [χ^2 = 335.55]. Similarly, for 1991, 55 (271) negative discretionary accrual firms have pre-discretionary earnings below (above) target earnings compared with 184 (23) of those with positive discretionary accruals [χ^2 = 265.49].

Table 2
Univariate results. Sample size equals 533. Firms are partitioned on the sign of the discretionary accrual

1988

			Medians		
DA Sign	*Size*	*Lev*	*Own*	*IS*	*Invest*
NEG ($N=315$)	11.105	0.120	15.630	0.019	−0.019
POS ($N=218$)	10.978	0.150	13.855	−0.038	0.049
p-value[a]	0.153	0.001	0.420	0.001	0.001

1991

			Medians		
DA Sign	*Size*	*Lev*	*Own*	*IS*	*Invest*
NEG ($N=326$)	11.418	0.170	6.215	0.013	−0.001
POS ($N=207$)	11.236	0.200	6.100	−0.024	0.007
p-value[a]	0.138	0.007	0.490	0.0001	0.019

[a]Mann-Whitney one-tailed test

POS = firms with discretionary accruals > 0;
NEG = firms with discretionary accruals < 0.

The procedure involves ranking all variables (both dependent and explanatory) and then estimating an OLS regression on the rank-transformed data. If the relationship between the dependent and explanatory variable is monotonic, a higher ranked explanatory variable will correspond to a higher ranked dependent variable. Using rank regression, the following model is estimated:

$$DA_t = \gamma_0 + \gamma_1 Size_t + \gamma_2 Lev_t + \gamma_3 Own_t + \gamma_4 Smooth_t + \gamma_5 Invest_t + \gamma_6 CFO_{Lt} + \gamma_7 CFO_{Ht} + \gamma_8 Int_t + \gamma_9 Life_t + \varepsilon_{jt} \quad (3)$$

where t is either 1988 or 1991 and all variables are as defined in section 4.

Results are presented in the first four columns of Table 3.[17] Consistent with univariate findings, estimated coefficients on *Smooth* and *Invest* have their predicted signs and are significant at $p < 0.05$ level in each extimation period. In contrast, the significance of the leverage term is restricted to the 1991 estimation period. Analysis of average leverage values reported in Table 1 provides one possible explanation for the instability of *Lev* across alternative estimation periods. Consistent with the poor economic performance and higher bankruptcy probability associated with the early 1990s, mean (median) leverage for the sample is significantly greater in 1991 compared with 1988 ($p < 0.001$ for a two-tailed Wilcoxon test). To the extent that leverage represents an efficient proxy for debt covenant violation, debt-related considerations for the average sample firm are likely to be of significantly higher priority in 1991, resulting in a more pronounced association between *Lev* and discretionary accruals in this period.

Coefficient estimates on *Own* also display pronounced variation across alternative estimation periods: while evidence consistent with the managerial ownership hypothesis is documented for both model specifications in 1988, no significant results are reported for 1991. Consistent with prior research findings, the coefficient estimate on *Size* is generally negative (but insignificant). All control variables, with the exception of CFO_L in 1991, display their predicted signs and are significant at the $p < 0.05$ level in both estimation periods, indicating the existence of persistent measurement error in the accounting choice proxy. As a group, the three costly contracting variables appear to explain relatively little of the cross-sectional variation in discretionary acruals activity compared with proxies for smoothing, signalling and measurement error. One possible interpretation of these findings is that costly contracting considerations represent only second order effects for the present sample. An alternative interpretation is that while costly contracting theory is fundamental to the explanation of accounting choice, the empirical proxies employed in the present tests lack sufficient power.

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[17] Regression (3) was also estimated using a standard OLS technique. In general, results using the full sample failed to support any of the predicted relations, while estimated coefficients proved extremely sensitive to outlier deletion. However, when all variables were trimmed to exclude the top and bottom 1% of the relevant distribution, use of the standard OLS procedure generated results consistent with those reported in the body of the paper.

To assess the stability of the findings to the modelling procedure employed, regression (3) was re-estimated using both trimmed least squares and least absolute value (LAV) regression techniques. Both procedures yielded quantitatively similar inferences to those reported in Table 3.

Significant correlations documented in Table 1 suggest that collinearity may be a potential problem. To assess the impact of ill-conditioned data, the diagnostic procedure suggested in Belsley, Kun and Welsch (1980) is employed. For M2 in Table 3, the highest condition index for 1988 (1991) is 24.67 (25.12), indicating that regressors may be involved in weak near dependencies. In both years, the dominant relation involves *Size* and the intercept term.[18] Auxiliary regressions indicate that coefficient estimates on *Smooth* (1988 and 1991) and *Lev* (1991) are indeed being degraded. Nevertheless, although degrading, collinearity is not harmful since each of these coefficients remains statistically significant.

5.3. Sensitivity analyses

This section reports the results of a series of tests designed to assess the sensitivity of the above findings to alternative model specifications. First, since accrual activity is likely to vary systematically across industrial classification, all models are re-estimated using industry-adjusted variables. To achieve the industry adjustment, all variables are first ranked within their industry-year groupings. To reflect the fact that different industries contain different numbers of firms, these ranks are then converted to percentiles using (rank–1)/(number of firms in industry–1). This conversion yields the percentile of the firm's rank within its industry-year, such that the lowest ranking firm in each industry receives a zero and the highest ranking firm receives a one.[19]

Findings reported in Table 3 (columns five and eight) result in quantitatively similar inferences to those previously documented for all variables, with one exception: the significance of *Own* declines in all models. At least two interpretations of this finding are possible: (i) managerial equity ownership has no inherent explanatory power and is instead proxying for industry effects; (ii) managerial ownership possesses explanatory power but is also correlated with industry.

Exploring the inconsistent findings for *Own* documented in Table 3, one possibility could be misspecification of the empirical relation. For example, Healy (1985) demonstrates that management compensation, and hence the nature of accounting discretion, is a non-linear function of reported income, with the direction of bonus plan-induced accounting choice being determined by the level of current earnings relative to the plan's parameters.[20]

Clearly, the level of managerial equity ownership represents a crude test of the bonus plan hypothesis since, although the extent of equity ownership may proxy for the existence of a bonus plan, it affords no insights as to the parameters of the plan, nor how current earnings relate to those parameters. As a result, the prediction of a negative linear association between discretionary accruals and managerial ownership may be too simplistic. Further, Niehaus (1989) documents evidence of a non-linear relation between inventory method choice and managerial ownership.

To address these concerns, two supplementary tests are performed. First, while the rank regressions reported in Section 5.2 implicitly address the parametric structure of the model by providing approximations to unknown non-linear relations between variables (Iman and Conover, 1979), an explicit test for non-linearity between accounting choice and managerial ownership is conducted. Following Morck, Shleifer and Vishny (1988), *Own* is decomposed into three categories ($<5\%$, 5–25%, and $>25\%$) which are then used to estimate piecewise rank regressions. Findings (not reported) indicate no evidence of a non-linear relation between accounting choice and managerial ownership,[21] suggesting that inconsistent estimates for the coefficient on *Own* across alternative models are unlikely to result from misspecification of the functional form of its association with the dependent variable.

The second test recognises that directional tests of discretionary accrual activity may be confounded if management compensation is a non-linear function of reported income. Under such circumstances, a more appropriate (but weaker) prediction is that the overall propensity for accrual activity increases with the existence of a bonus plan. This in turn leads to the prediction that the volatility of discretionary accruals is negatively related to managerial equity ownership.

To explore this prediction, accruals volatility, computed for each sample firm as the standard deviation of estimated discretionary accruals over the four-year period 1988–1991, is regressed on aver-

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[18] For 1988 (1991), the variance-decomposition proportions are 0.9816 and 0.9738 (0.9844 and 0.9744) for *Intercept* and *Size*, respectively.

[19] The sensitivity of the results to industry effects was also assessed (i) using a fixed effects model, and (ii) by omitting each industry in turn. In both cases the only inference to change was that regarding managerial ownership.

[20] Specifically, income-decreasing accruals are predicted when current period earnings are above (below) the upper (lower) bound of the bonus plan, while income-increasing accruals are predicted when current period earnings lie between the upper and lower bounds.

[21] A range of additional turning points were also assessed with similar null results. In an alternative specification, regression (3) was extended to include Own^2. Again, no evidence of a non-linear association was apparent.

Table 3
Estimated coefficients (with *t*-statistics in parentheses) from a rank regression of sample firm's discretionary accruals

		Ranked data				Industry-ranked data				Ranked data	
		1988		1991		1988		1991		M3	
Variable	Sign	M1	M2	M1	M2	M1	M2	M1	M2	1988	1991
Intercept	(?)	518.76	587.54	468.50	548.68	0.9334	0.9796	0.8511	0.9290	606.13	577.85
		(24.76)^{c}	(20.09)^{c}	(21.63)^{c}	(16.23)^{c}	(22.18)^{c}	(15.88)^{c}	(20.00)^{c}	(13.37)^{c}	(21.48)^{c}	(16.86)^{c}
Size	(-)	−0.0448	−0.0554	0.0487	−0.0076	−0.0058	−0.0175	0.0523	0.0078	−0.0519	−0.0073
		(−1.33)	(−1.40)	(1.38)	(−0.22)	(−0.16)	(−0.55)	(1.43)	(0.23)	(−1.38)	(−0,.21)
Lev	(+)	−0.0010	0.0213	0.0972	0.0670	0.0224	0.0329	0.0710	0.0618	0.0214	0.0646
		(−0.04)	(0.79)	(3.17)^{c}	(2.23)^{a}	(0.74)	(1.16)	(2.18)^{a}	(1.91)^{a}	(0.82)	(2.17)^{a}
Own	(-)	−0.0835	−0.1165	0.0026	−0.0231	−0.0572	−0.0682	−0.0138	-0.0278	−0.0993	−0.0143
		(−2.55)^{b}	(−3.84)^{c}	(0.08)	(−0.69)	(−1.75)	(−1.83)	(−0.39)	(−0.85)	(−3.39)^{c}	(−0.43)
Smooth	(-)	−0.9103	−0.8066	−0.8678	−0.8093	−0.9038	−0.7521	−0.8638	−0.7140	−0.7452	−0.7837
		(−27.74)^{c}	(−24.44)^{c}	(−24.88)^{c}	(−21.59)^{c}	(−24.69)^{c}	(−20.28)^{c}	(−22.08)^{c}	(−16.66)^{c}	(−22.83)^{c}	(−20.82)^{c}
Invest	(+)	0.0967	0.0576	0.1590	0.1325	0.0876	0.0623	0.1942	0.1453	0.0636	0.1186
		(3.56)^{c}	(2.22)^{a}	(5.39)^{c}	(4.49)^{c}	(3.03)^{b}	(2.45)^{b}	(6.26)^{c}	(4.89)^{c}	(2.54)^{b}	(4.04)^{c}
ΔCFO	(−)									−0.1727	−0.1019
										(−6.59)^{c}	(−3.75)^{c}
CFO_L	(+)		0.0884		−0.0702		0.0663		−0.0629	0.0416	−0.0952
			(1.64)		(−1.20)		(1.08)		(−0.99)	(0.80)	(−1.65)
CFO_H	(−)		−0.3724		−0.2487		−0.3543		−0.2888	−0.3101	−0.2376
			(−7.68)^{c}		(−4.48)^{c}		(−6.20)^{c}		(−4.82)^{c}	(−6.52)^{c}	(−4.32)^{c}
Int	(-)		−0.1159		−0.1131		−0.1119		−0.1407	−0.1233	−0.1156
			(−4.34)^{c}		(−3.73)^{c}		(−4.06)^{c}		(−4.61)^{c}	(−4.76)^{c}	(−3.86)^{c}
Life	(+)		0.1191		0.1515		0.2433		0.2648	0.1259	0.1446
			(4.33)^{c}		(5.11)^{c}		(8.27)^{c}		(8.70)^{c}	(4.76)^{c}	(4.92)^{c}
R2		61.58	68.17	54.78	58.91	56.14	64.95	49.65	58.69	70.56	59.92
F. value		171.570^{c}	127.602^{c}	129.891^{c}	85.758^{c}	137.169^{c}	110.53^{c}	105.937^{c}	84.969^{c}	128.530^{c}	80.522^{c}

$^{a(b/c)}$ Significant at the $p<0.05$ (0.01/0.001) level for a one-tailed test.

DA =discretionary accruals, computed using the cross-sectional Jones model
Size =logarithm of end of period sales
Lev =total assets/total liabilities
Smooth =1 if pre-discretionary earnings are greater than earnings, 0 otherwise
Invest = =growth in tangible assets plus R&D expenditure for the period, less industry median
CFO_L =1 for the lowest cash flow decile and 0 otherwise
CFO_H =1 for the highest cash flow decile and 0 otherwise
Int =gross fixed assets/total market capitalisation
Life =gross fixed assets/depreciation

age managerial equity ownership (*AVOWN*), calculated over the corresponding four-year window. If the existence of a bonus plan (as proxied by the level of managerial equity ownership) increases the propensity for management to exercise their accounting discretion, the coefficient on *AVOWN* will be negative and significant. Contrary to expectations, the parameter estimate on *AVOWN* in the univariate rank regression is 0.1705 ($p < 0.01$). Further, the positive sign on *AVOWN* persists when the model is extended to include variables which control for documented sources of measurement error in estimated discretionary accruals, although the significance level declines ($p = 0.043$).

In sum, these results provide no evidence of an increase in the propensity for management to exercise their accounting discretion as equity ownership interests decline. Clearly, while the results of this supplementary test suggest that the inconsistent findings reported for *Own* in Table 3 are unlikely to result from misspecification of the predicted empirical relationship between discretionary accruals and managerial ownership, the test does not address the more fundamental question regarding the extent to which managerial equity ownership represents an effective proxy for the existence of an earnings-based compensation plan.

Tests of the debt-equity hypothesis reported in Table 3 regress estimated discretionary accruals (a flow variable) on leverage (a levels variable). To the extent that management may only be motivated to manipulate accruals upwards in the event of an increase in the debt ratio, a more appropriately specified test may involve regressing estimated discretionary accruals on the change in leverage.[22] To address this concern, an alternative leverage measure (*Lev2*) for 1991 is constructed.[23] First, a three-year average leverage measure is computed for each sample firm over the period 1988–1990. *Lev2* is then defined as a binary variable, taking the value of one if a firm's 1991 leverage ratio is above its three-year average, and zero otherwise. Regression (3) is then re-estimated following the substitution of *Lev2* for the original leverage measure.

Consistent with previous results using the levels measure of leverage, the estimated coefficient on *Lev2* is positive (0.0591) and significant ($p < 0.05$). Further, the parameter estimates on all other variables remain quantitatively similar to those previously reported. These findings indicate that the results reported in Table 3 are insensitive to the use of either a levels or changes measure of leverage to proxy for debt covenant violation.

As Samuels, Rickwood and Piper (1989: 14) discuss, to the extent that accrual accounting allows the reporting of receipts and outlays to be allocated to 'appropriate' periods, accruals implicitly facilitate income smoothing. The important issue in the present context, therefore, is the extent to which the smoothing activity reported in Section 5.2 reflects an explicit attempt on the part of management to reduce the variance of reported earnings, rather than merely capturing the implicit smoothing nature of the accrual accounting mechanism. To address this question, regression (3) was extended to include a proxy for the inherent smoothing property of accounting accruals. All else equal, implicit income smoothing is expected to induce positive (negative) accruals when realised cash flows are below (above) expectations. Change in operating cash flow (ΔCFO) is employed as a measure of current period cash flow levels, relative to expectations.[24]

Results reported in Table 3 (M3; columns 9-10) are consistent with the notion of implicit smoothing: the coefficient on ΔCFO has the predicted sign and is significant at the 0.0001 level, whilst the explanatory power of the model increases. Moreover, the significance of the explicit smoothing proxy declines, suggesting that *Smooth* is indeed capturing an element of implicit smoothing. Nevertheless, since *Smooth* remains significant at all conventional levels in Table 3, the inferences drawn in section 5.2 remain valid.

The self-reversing property of accounting accruals is such that income-increasing (decreasing) choices made in one period will inevitably lead to understated (overstated) income in some future period(s). Thus, accrual choices made in a prior period may be reversing in the test period, contaminating the measure of accounting discretion. In addition, because management is not endowed with an infinite stream of income-increasing (decreasing) procedures, current period discretion is likely to be conditional on prior period accounting choice. Thus, although the desire for income-switching behaviour may be constant across firms of a similar type, only a subset of those firms may be in a position to exploit their financial reporting discretion. As a final check on the sensitivity of the results, the impact of accrual-reversals is examined.

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[22] The author acknowledges an anonymous referee for this point. However, using the change in leverage as opposed to the level of leverage as a proxy for debt covenant violation may not automatically yield a more appropriate test: an increase in a firm's debt-equity ratio does not necessarily indicate that the firm is approaching debt covenant violation (e.g. if a firm starts from a position of a low debt, even a substantial rise in the debt-equity ratio is unlikely to significantly increase the probability of debt covenant violation). Focusing on the change in leverage could, therefore, serve to increase the likelihood of non-violation firms being missclassified as potential violators, thereby reducing the power of the empirical test.

[23] A similar test procedure is not performed for 1988 due to data restrictions.

[24] A changes model has been widely employed in the market-based accounting literature to proxy for unexpected cash flows (e.g. Ali, 1994). However, the assumption of a random walk process generating cash flows is naïve given the negative serial correlation observed for this series (e.g. Dechow, Kothari and Watts, 1996).

Two procedures are employed to assess the effect of accrual-reversals on the findings reported in Section 5.2. First, a binary variable (*PYA*) is defined, taking the value of one if the prior year discretionary accrual (1987 or 1990) is negative, and zero otherwise. If discretionary accruals are self-reversing, then one should expect to observe a negative coefficient on *PYA*. Consistent with this prediction, the estimated coefficient on *PYA* in Table 4 (columns 1 and 2), is negative and significant at the 0.001 level in both estimation periods. Since the estimated coefficients on all test variables remain quantitatively identical to those previously reported, initial indications suggest that prior results are robust to accrual reversal effects.

As an additional test of the impact of accrual reversals, sample firms are partitioned into two portfolios according to the sign of last period's discretionary accrual. Separate rank regressions are then estimated for each portfolio. All else equal, if accrual reversal effects are significant, one would expect a greater likelihood of observing income-increasing (decreasing) discretionary accruals activity in the negative (positive) portfolio and *vice versa*.

Results reported in Table 4 provide some evidence consistent with this prediction. A Chow (1960) test rejects the null hypothesis ($p < 0.05$) that some or all of the regression coefficients are

Table 4

Estimated coefficients (with *t*-statistics in parentheses) from a rank regression of sample firm's discretionary accrual activity to test for evidence of accrual reversal effects

		Ranked data		**Industry-ranked data**			
		M4		**1988**		**1991**	
Variable	**Sign**	**1988**	**1991**	POS	NEG	POS	NEG
Intercept	(?)	1.1524	1.1009	1.1514	0.9614	0.8158	1.0041
Size		(18.63)^{c}	(14.83)^{c}	(11.31)^{c}	(13.44)^{c}	(6.58)^{c}	(12.27)^{c}
	(−)	−0.0769	0.0189	0.0034	−0.0134	0.1571	−0.0438
		(−0.57)	(0.59)	(0.07)	(−0.36)	(2.71)^{b}	(−1.12)
Lev	(+)	0.0339	0.0571	0.0955	−0.0129	0.0924	0.1392
		(1.30)	(1.96)^{a}	(1.18)	(−0.39)	(2.06)^{a}	(2.73)^{b}
Own	(−)	−0.0636	−0.0161	−0.0225	−0.0740	0.0707	−0.0590
		(−2.24)^{a}	(−0.52)	(−0.44)	(−2.09)^{a}	(1.21)	(−1.59)
Smooth	(−)	0.6345	−0.6478	−0.6938	−0.6608	−0.7697	−0.8862
		(−17.63)^{c}	(−15.35)^{c}	(−11.26)^{c}	(−14.80)^{c}	(−10.93)^{c}	(−11.21)^{c}
Invest	(+)	0.0655	0.1207	0.0698	0.0741	0.1674	0.0928
		(2.40)^{b}	(4.19)^{c}	(2.65)^{b}	(2.76)^{b}	(3.67)^{c}	(2.52)^{b}
Δ*CFO*	(−)	−0.2771	−0.2197	−0.2171	−0.2321	−0.1341	−0.1968
		(−9.92)^{c}	(−6.95)^{c}	(−4.54)^{c}	(−7.08)^{c}	(−2.56)^{b}	(−5.80)^{c}
PYA	(−)	−0.1799	−0.1305				
		(−5.21)^{c}	(−3.20)^{c}				
CFO_L	(+)	−0.0409	−0.1345	−0.1319	0.0854	−0.0499	−0.0312
		(−0.71	(−2.18)^{b}	(−1.38)	(1.18)	(−0.45)	(-0.39)
CFO_H	(−)	−0.2601	−0.2358	−0.4062	−0.2093	−0.0903	−0.2989
		(−4.87)^{c}	(−4.07)^{c}	(−3.32)^{c}	(−3.11)^{c}	(−0.89)	(−4.24)^{c}
Int	(−)	−0.1133	−0.1372	−0.1496	−0.1024	−0.1132	−0.1611
		(−4.47)^{c}	(−4.66)^{c}	(−3.32)^{c}	(−3.32)^{c}	(−2.28)^{a}	(−4.43)^{c}
Life	(+)	0.2121	0.2374	0.1908	0.2616	0.1890	0.3095
		(7.63)^{c}	(7.41)^{c}	(3.88)^{c}	(7.71)^{c}	(3.49)^{c}	(8.46)^{c}
R2		70.53	62.05	68.70	69.48	65.40	60.93
F		116.73^{c}	80.090^{c}	38.980^{c}	82.518^{c}	35.584^{c}	55.271
N		533	533	174	359	184	349

$^{a(b/c)}$ Significant at the $p < 0.05$ (0.01/0.001) level for a one-tailed test.

PYA is a dummy variable coded 1 if the prior year's discretionary accrual is negative, and 0 otherwise.
All remaining variables are as defined in section 4.
For the regressions reported in the final four columns of the table, the sample has been partitioned on the basis of the sign of the prior year's discretionary acccrual. POS is the subsample of firms with positive discretionary accruals in the prior period and NEG is the subsample of firms with negative dicretionary accruals in the prior period.

similar across alternative sample partitions for both estimation periods. Leverage, ownership, and smoothing effects appear more pronounced in both estimation periods for firms in the negative prior-year accruals portfolio. However, only in the case of the ownership variable is the significance of the predicted relation confined solely to one of the partitions. Thus, although results indicate that conditioning the analysis on past accounting choices may improve the power of the empirical test, the impact of accrual reversals does not appear to be a first order effect.

6. Summary and conclusions

This study presents evidence regarding the determinants of managerial accounting discretion for a heterogeneous sample of UK industrial and commercial firms. Findings indicate that income smoothing considerations appear to dominate in the cross section. Although part of this smoothing activity is shown to be a consequence of the inherent smoothing property of accrual accounting, the continued significance of *Smooth* after controlling for implicit income smoothing lends support to the hypothesis that managers actively employ their accounting discretion to reduce the volatility of the reported earnings series. However, what remains unclear from these results is the underlying rationale for smoothing behaviour. Research directed towards discriminating between the competing explanations for income smoothing therefore represents a potentially fruitful area for future work.

Results also provide consistent support for the prediction that managers employ their accounting discretion to signal expected future cash flow performance. However, the present study only addresses part of the issue, i.e. the signalling of expected future benefits. It remains to be shown whether management are equally as well motivated to signal expected future losses. Further, empirical tests of the signalling hypothesis are unable to distinguish between instances of 'truthful' signalling, and cases where managers pursuing shareholder wealth-decreasing investments (e.g. as a result of 'empire building') attempt to replicate this strategy in order to achieve the associated payoffs.

A striking feature of the study is the relatively poor explanatory power of variables proxying for economic consequence theories. One interpretation is that, for the present sample, costly contracting considerations represent only second order effects. An alternative interpretation is that while costly contracting theory is fundamental to explaining accounting choice, the empirical proxies employed in the present tests lack sufficient power.

An important contribution of the study is the observed variation in the strength of the relation between leverage and accounting policy choice across time. It is argued that this variation reflects changes in the probability of debt covenant violation for the average sample firm. This finding suggests the importance of conditioning cross-sectional accounting choice studies on underlying macro-economic conditions. Limited evidence is also presented which suggests that the magnitude of the association between discretionary accruals activity and leverage, ownership, and smoothing may be conditional on prior-period accounting choices.

An important caveat regarding the interpretation of these results relates to the reliance placed on accruals-based measures of accounting choice. Prior research suggests that estimated discretionary accruals contain significant measurement error. Despite explicit control for potential sources of such error, the possibility remains that misspecification of the accounting choice proxy may underlie some (all) of the observed relations. Finally, although some attempt is made to condition the analysis on the opportunity for accounting discretion, many important determinants of managerial discretion have not been considered. In particular, no attempt has been made to control for the impact of differential corporate governance mechanisms. The effect of governance structures on managerial accounting discretion has yet to be rigorously tested and therefore offers significant scope for future research.

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In Praise of Occam's Razor: A Critique of the Decomposition Approach in IAS 32 to Accounting for Convertible Debt

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Abstract—IAS 32 *Financial Instruments: Disclosure and Presentation* (1995) raises a number of questions. In particular, it is argued that the Standard's requirements on accounting for, and the classification of, compound financial instruments by the issuer, are based on reasoning that is conceptually flawed. This paper proposes that a compound financial instrument be viewed as a single instrument with a dual nature, comprising the nature both of liability and equity. Under this concept, the instrument cannot be decomposed into severable component parts. Rather, it should be treated as wholly liability or wholly equity, depending on whether the liability or equity nature is dominant at a particular time.

1. Introduction

This paper questions the recommendations of IAS 32 *Financial Instruments: Disclosure and Presentation* (1995) on accounting for compound financial instruments. It is argued that the International Accounting Standards Committee (IASC) in these recommendations has not upheld the maxim of 'Occam's Razor', that is: 'Entities are not to be multiplied without necessity' (Russell 1946: 494).

IAS 32 is significant for several reasons. First, it is the outcome of a joint project over several years between the IASC and the Accounting Standards Board of the Canadian Institute of Chartered Accountants. In a sense, it marks the IASC's coming of age, as the Standard is not an adaptation of an exisiting national standard or standards. Second, the Standard is timely, as in the absence of regulation complex financial instruments in the business world have been addressed by a variety of accounting treatments. Third, the Standard will be a model not only for developing countries, but also for countries with a long history of standard setting. For example, the Australian standard, AASB 1033 *Presentation and Disclosure of Financial Instruments* (1996), is closely modelled on IAS 32. This may be partly attributable to the growing strength of the movement to harmonise with the international standards.

Section 2 of this paper reproduces certain definitions in and explains the requirements of IAS 32 on classification and disclosure of compound financial instruments, and makes use of an illustration provided in its Appendix. Section 3 contains a number of criticisms of these definitions and requirements, followed by a description of the UK approach to accounting for compound financial instruments in Section 4. An alternative approach to the classification and disclosure problem is offered in Section 5. Section 6 discusses the probability of conversion in external reporting, while the final section contains a summary and conclusion.

2. IAS 32—definitions, requirements and illustration

2.1. Definitions

The following definitions are given in IAS 32 (para. 5):

> A financial instrument is any contract that gives rise to both a financial asset of one enterprise and a financial liability or equity instrument of another enterprise.
>
> A financial liability is any liability that is a contractual obligation:
>
> (a) to deliver cash or another financial asset to another enterprise; or

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> (b) to exchange financial instruments with another enterprise under conditions that are potentially unfavourable.
>
> An equity instrument is any contract that evidences a residual interest in the assets of an enterprise after deducting all of its liabilities.

The commentary in paragraph 6 explains:

> In this Standard, the terms 'contract' and 'contractual' refer to an agreement between two or more parties that has clear economic consequences that the parties have little, if any, discretion to avoid, usually because the agreement is enforceable at law.

Paragraphs 18 and 23 form part of the Standard; the remainder are accompanying commentary:

> 18. The issuer of a financial instrument should classify the instrument, or its component parts, as a liability or as equity in accordance with the substance of the contractual arrangement on initial recognition and the definitions of a financial liability and an equity instrument.
>
> 23. The issuer of a financial instrument that contains both a liability and an equity element should classify the instrument's component parts separately in accordance with paragraph 18.
>
> 24. This Standard requires the separate presentation on an issuer's balance sheet of liability and equity elements created by a single financial instrument. It is more a matter of form than substance that both liabilities and equity interests are created by a single financial instrument rather than two or more separate instruments. An issuer's financial position is more faithfully represented by separate presentation of liability and equity components contained in a single instrument according to their nature.
>
> 26. Classification of the liability and equity components of a convertible instrument is not revised as a result of a change in the likelihood that a conversion option will be exercised, even when exercise of the option may appear to have become economically advantageous to some holders. Holders may not always act in the manner that might be expected because, for example, the tax consequences resulting from conversion may differ among holders. The issuer's obligation to make future payments remains outstanding until it is extinguished through conversion, the maturity of the instrument or some other transaction.
>
> 28. This Standard does not deal with measurement of financial assets, financial liabilities and equity instruments and does not therefore prescribe any particular method for assigning a carrying amount to liability and equity elements contained in a single instrument. Approaches that might be followed include:
>
> (a) assigning to the less easily measurable component (often an equity instrument) the residual amount after deducting from the instrument as a whole the amount separately determined for the component that is more easily measurable; and
>
> (b) measuring the liability and equity components separately and, to the extent necessary, adjusting these amounts on a pro rata basis so that the sum of the components equals the amount of the instrument as a whole.
>
> The sum of the carrying amounts assigned to the liability and equity components on initial recognition is always equal to the carrying amount that would be ascribed to the instrument as a whole. No gain or loss arises from recognising and presenting the components of the instrument separately.

2.2. Example

The following example is provided in the Appendix to IAS 32:

> An enterprise issues 2,000 convertible bonds at the start of Year 1. The bonds have a three-year term, and are issued at par with a face value of $1,000 per bond, giving total proceeds of $2,000,000. Interest is payable annually in arrears at a nominal annual interest rate of 6%. Each bond is convertible at any time up to maturity into 250 common shares.
>
> When the bonds are issued, the prevailing market rate for similar debt without conversion options is 9%. At the issue date, the market price of one common share is $3. The dividends expected over the three-year term of the bonds amount to $0.14 per share at the end of each year. The risk-free annual interest rate for a three year term is 5%.

Liability valuation and residual valuation of equity component

Under this approach, the liability component is valued first, and the difference between the proceeds of the bond issue and the fair value of the liability is assigned to the equity component. The present value of the liability component is calculated using a discount rate of 9%, the market interest rate for similar bonds having no conversion rights, as shown below:

Present value of the principal—$2,000,000 payable at the end of three years	$1,544,367
Present value of the interest—$120,000 payable annually in arrears for three years	303,755
Total liability component	1,848,122
Equity component (by deduction)	151,878
Proceeds of the bond issue	**2,000,000**

Independent equity component valuation

The IAS 32 example also illustrates the use of a version of the Black-Scholes option pricing model to value the equity component. It is assumed that the mean and standard deviation of the share price is $3 and 30% respectively and that conversion takes place at maturity. Employing present value tables and a number of statistical calculations, the fair value of the equity component is determined as $144,683. A small resulting difference ($2,000,000—($1,848,122 + $144,683)) is attributed to calculation error and prorated over the fair values of the two components.[1]

3. Criticisms of IAS 32

3.1. *Inconsistency with IASC Conceptual Framework*

The definition of financial liability adopted in IAS 32 is not consistent with that of a liability given in the 1989 IASC conceptual framework, *Framework for the Preparation and Presentation of Financial Statements* (hereafter CF):

> A liability is a present obligation of the enterprise arising from past events, the settlement of which is expected to result in an outflow from the enterprise of resources embodying economic benefits.

Further, according to the CF, an item that meets the definition of an element should be recognised if:

> (a) it is probable that any future economic benefit associated with the item will flow to or from the enterprise; and
> (b) the item has a cost or value that can be measured with reliability.

The definitions provided by the CF focus on a probable outflow in a future period. In contrast, IAS 32 emphasises a contractual future outflow. No explanation of the departure from the guidelines contained in the CF is given in IAS 32. It should be noted that a financial liability as defined in IAS 32 cannot be considered a subset of the liability as defined in the CF, since a contractual liability may not constitute a probable outflow, for example, where it is highly unlikely that a convertible debt will be redeemed.

They differ in another aspect. A liability can exist on account of a probable outflow which is not contractual; for example, a firm might have a policy of rectifying product faults beyond the warranty period (CF, paragraph 60). It is not known how much this departure from the CF has contributed to the subsequent classification and measurement rules contained in IAS 32. On principle, any departure in IAS 32 or other future standards from the CF needs to be explained and justified.

3.2. *Separability in the Context of Transactions v. Valuation*

The claim in IAS 32, paragraph 24, that it is only a matter of form that the single instrument is not represented by two separate instruments, can be challenged. The holder of two separate instruments might well sell one and keep the other, a transaction that cannot be envisaged by the holder of a single instrument. A compound financial instrument, such as a convertible bond, has a dual nature comprising both liability and equity, rather than two separate component parts. This is the case of a two-faced instrument, not an instrument of two parts.[2]

It may be argued that while the compound instrument cannot be separated for transaction purposes, it can (and will) be separated for valuation purposes. In practice, it is common to value a compound instrument as a whole using theoretical models which separately value the component parts and then sum these to obtain the value of the compound instrument (Gepts, 1987; County NatWest Woodmac, 1991; Zubulake, 1991).

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[1] A modified example of the Black-Scholes formula is given below:

$C = S^*N(d_1) - Ee^{-rT}N(d_2)$

where C = call option price:

$S^* = S - \Sigma D_t(1 + r)^{-t}$;

where S = share price and

D = dividends at t, $t = 1, 2, \ldots, n$.

$d_1 = [\ln(S^*/E) + (r + \frac{1}{2}\sigma^2)T]/\sigma\sqrt{T}$;

$d_2 = d_1 - \sigma\sqrt{T}$;

E = exercise price;

= risk free rate of interest;

T = number of years to option expiration;

σ^2 = variance of the share price; and

$N(.)$ = the normal distribution function.

[2] This argument is presented succinctly in *Accounting Principles Board Opinion*, 14 (1969). *APB Opinion*, 14, argues that the proceeds should be accounted for as wholly debt. The Board placed 'greater weight on the inseparability of the debt and the conversion option, and less weight on the practical difficulties' (paragraph 12). On the other hand, King, Ortegren and King (1990), in their critique of *APB Opinion*, 14, focused largely on implementation issues and demonstrated the practicability of dichotomising the two components.

Two points need to be considered. First, IAS 32 is not addressing a valuation problem. In the example provided in the Appendix to IAS 32, it is *known* that the value of the compound instrument to be recorded is $2,000,000. As this value is given, the use of the present value and the Black-Scholes models in the example represents a violation of the 'Occam's Razor' maxim. Further, the inaccuracy of such models makes necessary an arbitrary allocation of a residual difference, as illustrated in the example.

The second point is the argument that the reporting of two component parts at the time of issue sends an appropriate signal about the nature of the convertible instrument to the marketplace. This argument must be rejected. It may be argued that a more economical way to inform market participants is simply to alert them to the terms of issue contained in the notes to the accounts.

3.3. *Immutability of Original Classification*

In the example, it is shown that the fair value of the liability component at the issuance date is in excess of 90% of the proceeds of the convertible debt issue. It seems not unreasonable to question the intent of the classification requirement if the liability component is to be reported at over 90% of the full carrying value of the convertible debt over its entire life. It might be argued that a contractual outflow exists, and that therefore a liability representing the contractual outflow should be disclosed over the period to maturity; but it can equally be argued that there is a contractual obligation to issue more equity which should be disclosed.

In not allowing revision of the initial classification ratio, IAS 32 (paragraph 26) argues, first, that holders' actions are unpredictable; some may convert and some may not (because of tax consequences, etc.). It is possible that holders may behave differently at the margin when the opportunity cost of conversion is close to the share price, but otherwise all investors' behaviours are governed by economic considerations. Second, it is argued that the likelihood of conversion will change from time to time. This is a function of the volatility of the share price, which might need to be taken into account in specific cases. Financial reporting should reflect market realities, not ignore them. The arguments in IAS 32 are unconvincing.

3.4. *Imposition of Historical Cost Measurement*

Classification and measurement are closely related issues. The assertion in paragraph 28 that '[t]his Standard does not deal with measurement of financial assets, financial liabilities and equity instruments...' refers to a relatively trivial point. The Standard's stipulation that the classification made at the time of issuance cannot be revised in future years (paragraph 26) imposes on the issuer, by implication, reporting at historical cost. A fundamental accounting measurement issue is whether financial instruments should be reported at historical cost or market value. An earlier Australian exposure draft, ED 59 'Financial Instruments' (1993, para. 87) recommended:[3]

> Two different bases exist by which financial assets and financial liabilities may be measured subsequent to initial recognition—'cost' and 'net market value'.

It is beyond the scope of this paper to debate the relative merits of measuring financial assets or financial liabilities (including compound instruments) at historical cost or market value.

The use of historical cost is implicitly required by IAS 32. Embedded in the current or market value of a convertible debt might be a very low probability of redemption and hence low value for the liability component, matched by a very high probability of conversion and hence high value for the equity component, should the expected share price exceed the exercise price at a future reporting date. Generally accepted accounting principles rule out the use of market value in measuring the equity component and hence the compound instrument itself in a *subsequent* reporting period. The no-revision rule imposes the use of historical cost on the reporting entity.

While a no-revision classification rule implies historical cost accounting, the converse is not true. If the no-revision rule is abandoned, the classification ratio can be changed to reflect the fact that the likelihood of redemption has changed from high to low. Within a historical cost framework, the upper bound of the equity component is equal to the historical amount of the convertible debt less the present value of future interest payments.

3.5. *Income Measurement Issues*

There are various interesting issues that are implied by the decomposition process adopted in IAS 32—for example, the treatment of interest expense. Some accountants believe that the decomposition approach holds benefits for income measurement. The recognition of the debt component as a separate amount provides an opportunity to charge an imputed interest in the income statement, obtained by applying the market interest rate to the debt component outstanding, as demonstrated in McInnes, Draper and Marshall (1991). The implied benefit lies in the use of a more refined matching procedure.

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[3] ED 59 was superseded by ED 65 (1995) and subsequently AASB 1033 (1996). The last two follow closely IAS 32.

There are some counter arguments. First, the matching process has lost much of its theoretical appeal. Current day conceptual framework projects define revenues and expenses in terms of changes in assets and liabilities. Second, the use of imputed interest is a refinement of an allocation procedure and all allocations are necessarily arbitrary and incorrigible (Thomas, 1969). IAS 32 is silent on the implications of decomposition for income measurement. The issue is outside the scope of this paper but deserves an extended analysis elsewhere.

4. The UK approach to accounting for compound financial instruments

It may be useful at this juncture to consider briefly the UK approach to accounting for compound financial instruments. FRS 4 *Capital Instruments* (ASB, 1993b) rules out decomposition and requires convertible debt to be classified wholly as a liability until conversion/redemption. The rationale underpinning this requirement is contained in FRS 4, Appendix III, paragraphs 14–15:

> There are a number of possible approaches to the accounting for convertible debt, but the most usual is to report it as a liability. Although this is uncontroversial where conversion is uncertain or unlikely, it is sometimes argued that where conversion is probable convertible debt should be reported outside liabilities.
>
> The FRS, however, requires convertible debt to be reported within liabilities irrespective of the probability of future conversion. This is because the balance sheet is a record of the financial position of the company at a point in time, rather than a forecast of future events. (This is not, of course, to deny that financial statements may be useful in forming an assessment of future events.) There are difficulties with the idea that convertible debt should be classified according to the probability of conversion, notably in specifying how the probability of conversion should be judged, whether convertible debt should be reclassified if the probability of conversion changes, and whether the interest on convertible debt that is not reported as a liability should be deducted in arriving at profit before taxation.

Many opponents to the approach adopted in FRS 4 felt that the regulation would be at odds with the Board's position on the substance versus form debate (ASB, 1991; 1992a; 1992b; 1993a). However, the ASB felt that in *substance* a liability still remained for such convertible debt issues, regardless of the probability of conversion and that FRS 4 is consistent with the dominance of substance over form and the exposure draft that led to FRS 5 *Reporting the Substance of Transactions* (ASB 1994).[4]

Several points can be made. First, not all accountants would agree with the ASB's interpretation of substance over form, but unfortunately this is a semantic issue that cannot be resolved by logic or observation. Second, if conversion is probable, FRS 4 is not consistent with the UK conceptual framework, which recommends that a liability should be recognised if it is probable that a future economic benefit will flow from the enterprise. Third, coexisting with the obligation to redeem the debt is an obligation to issue equity.

It may be interesting to see qualified support for the official British position in an Australian conceptual framework document, which argued that (SAC 4, 1995, paragraph A65):[5]

> The Boards have adopted the view that while the recognition criterion of probability is an appropriate concept for the elements in general, practical application of that concept may need to be varied in some accounting standards, so as to foster reliable and comparable reporting for items which are particularly subject to uncertainty. For example, Exposure Draft ED 59 *Financial Instruments* had proposed that the component parts of liability/equity compound financial instruments (such as debt securities that are convertible into ordinary shares) that are initially classified as liabilities by issuers would continue to be classified as liabilities whether or not the general probability criterion for recognition as a liability is satisfied, except when the next opportunity for conversion or redemption is within 12 months of the reporting date.

The weakness of the above argument is commented on in sub-section 5.2.

5. An alternative solution

5.1. Old Wine in New Bottles

IAS 32 views a compound financial instrument as comprising two component parts. The claim that it is only a matter of form that the single instrument is not represented by two separate instruments has been disputed in the previous section. Rather, a convertible debt can be conceived as a single financial instrument with a dual nature, comprising the nature both of liability and equity.

Under this concept, the instrument cannot be decomposed into severable component parts; it can be said that its liability nature or equity nature is dominant at a particular time. The accountant's problem is to identify which is the dominant nature and classify the instrument accordingly for reporting purposes within the historical cost framework. The classification issue is redefined, in which the compound instrument is not dichotomised into its liability and equity components. Rather, it is treated as wholly debt or wholly equity depending on the probability or expectation of a future outflow. This approach to the measurement and reporting of the liability is consistent with the CF and other conceptual frameworks.

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[4] The authors are indebted to a reviewer of this journal for this brief account of UK GAAP.

[5] See footnote 7.

The recommendations in this paper are not new.[6] Its treatment conforms with the approach in the original version of the Australian document, SAC 4 'Definition and Recognition of the Elements of Financial Statements' (1992), Appendix, paragraph 27, reproduced in full below:[7]

> Convertible debt securities give the holder the right to receive interest periodically and repayment of the principal amount on maturity, and an option to convert the securities to ordinary shares on specified terms. While these securities meet the definitions of liabilities, they may fail to meet the criteria for recognition as liabilities because of the option to convert the securities to ordinary shares. If conversion of the securities is the probable outcome, they would not meet the criteria for recognition as liabilities since it would not be probable that a sacrifice of service potential or future economic benefits would be required to settle the present obligation, in which case the securities would need to be classified as equity. If redemption of the securities is the probable outcome, they would need to be classified as liabilities. If the probable outcome changes during the term of the securities, the securities would need to be reclassified to reflect the changed circumstances. Whether the option is exercised or the securities are allowed to mature will generally depend on the relationship between the market price of the ordinary shares at the conversion date and the conversion price. The closer the maturity date of the securities, the more likely it will be that an excess of market price over conversion price would result in an assessment that conversion of the securities is probable.

The notion of fuzzy sets provides an alternative way of looking at this problem.[8] Fuzzy sets differ from classical sets in that membership of a fuzzy set is not binary in nature. Rather, there is a continuum along which the degree of membership is positioned (see Zadeh [1965] for an introduction to fuzzy set theory, and Zebda [1989; 1991] for applications in accounting).

IAS 32, in forcing classification of a compound instrument as partly liability and partly equity, inadvertently advocates the longevity of classical sets for classifying source of capital. The approach recommended in this paper would involve ascertaining which membership of association is greatest and classifying the instrument accordingly. Strictly, this is not a fuzzy set approach but at least it is philosophically consistent with such an approach, i.e. a two-faced instrument rather than an instrument of two parts.

Two problems associated with the recommended approach in this paper are addressed in sub-sections 5.2 and 5.3 below.

5.2. Operationalising the Accounting Term 'Probable'

The expression 'probable' is used in a number of conceptual frameworks in defining a liability (e.g. in the US), or in defining the recognition of a liability (e.g. IASC and in Australia). In order to implement recognition, the expression 'probable' itself has to be defined in quantitative terms, that is $p \geq y\%$. This task so far has eluded accountants.

In the US, Beaver (1991) reported that in accounting practice 'probable' might be taken to mean well over a 50% chance of occurring, say, between 70–90% or even 'virtually certain to occur'. As it is difficult to conceive of accountants being so reluctant to recognise a liability, it is concluded that the FASB has difficulty in interpreting this expression.

In Australia, the AARF has explained that the term 'probable' means 'more likely than less likely' (SAC 4, 1995, paragraph 67), an interpretation with which some accountants might not agree. $p = 0.501$ satisfies this interpretation, yet this probability is close to obtaining head or tail on the throw of an unbiased coin. A related issue is whether the term 'probable' is to be interpreted the same way for liabilities as for assets. The answer given by the AARF is in the affirmative. On this matter, the AARF is not aligned with the IASC and the UK Accounting Standards Board, whose conceptual frameworks include 'prudence' as a desirable qualitative characteristic (whereas the Australian framework does not).

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[6] Also, Purdy (1990) recommends the treatment of convertible notes as debt when the conversion value is below that of equivalent straight debt, and as equity when above. However, Purdy focuses on preserving double entry in the books rather than conceptual clarity, and his alternative treatments all entail entries to discount on debt (a debit) and to equity (a credit).

[7] SAC 4 (1992) was superseded by SAC 4 (1995), which indicates that difficulties exist with the practical application of the concept of probability in accounting for convertible debt (1995, paragraph A65, reproduced in section 4).

[8] The authors are indebted to an anonymous reviewer of this journal for this insightful input.

Other qualities of accounting information common to most conceptual frameworks are relevance, reliability and comparability. To report an amount as a liability when the probability criterion indicates that a liability should be recognised and to continue to report the same amount as a liability in subsequent years, when the probability criterion indicates that a liability should not be recognised, cannot possibly 'foster reliable and comparable reporting for items which are particularly subject to uncertainty' (SAC 4, 1995, para. A65).

The concept of a probability criterion should have taken uncertainty into account. The chance of an unspecified disaster does not preclude statisticians (for example, actuaries) from calculating a probability criterion within acceptable confidence limits. The claim of accountants that it is too difficult to apply a suitable probability criterion consistently will not lead to improved financial reporting. A top priority for standard setters is to clarify the probability concept in an accounting context and develop a suitable probability criterion.

5.3. Identifying the Crossover Boundary

The second problem is to identify the crossover boundary from recognition to non-recognition (or vice versa) of the convertible debt as a liability. This is a function of the exercise or redemption price, the share price and its standard deviation. In the example given in Section 2, the exercise or redemption price per common share (x) is \$4. If it can be assumed that the share price is normally distributed with a mean (m of \$3 and a standard deviation (sd) of \$0.90, then the z value is calculated as follows: $z = (x-m)/sd = (4-3)/0.9 = 1.11$, that is, the redemption price is 1.11 standard deviations to the right of the mean. This indicates that the probability of redemption (p) is 0.8665 (represented by the non-hatched area in Figure 1) and the probability of conversion ($1-p$) is 0.1335 (represented by the hatched area).

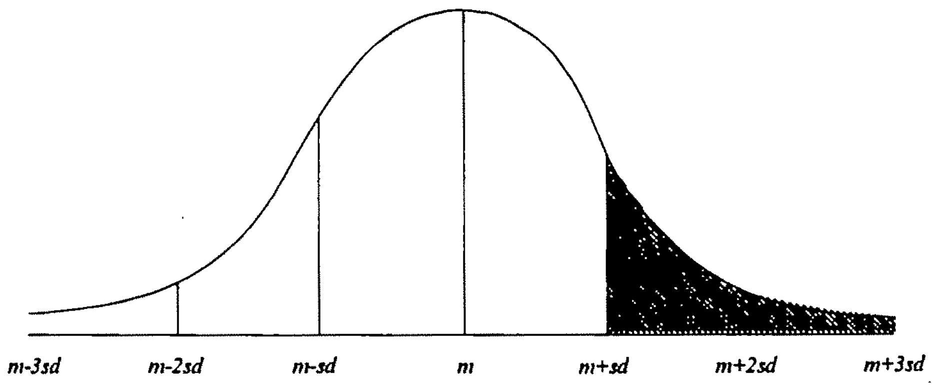
Figure 1 shows the value of p at the time of issuance. If the expected share price has increased in a following year, the boundary line in Figure 1 will shift to the left. When the value of p is less than y per cent, the convertible debt should no longer be recognised as a liability and will be recognised as equity.

For simplicity, the above demonstration assumes that the share price is normally distributed. In practice, the assumption is not realistic and can be relaxed. The Black-Scholes model implies that the distribution of share prices at the end of a given time period (e.g. at the exercise date) is lognormal, i.e. the natural logarithm of the share price is normally distributed (Hull, 1993: 210; Peirson, Bird, Brown and Howard, 1990: 640). Ex ante price behaviour would need to be modelled on past observations. If this is considered to give an adequate approximation, the problem posed by the share price distribution is not intractable.

The above resolution of the liability recognition issue is dependent on the normal or lognormal distribution of a variable (viz. the share price) which will largely determine the occurrence or non-occurrence of the liability event. It is seen that a simple solution is available for the convertible debt example given in the Appendix to IAS 32.

Of course, there are more complex considerations where convertible debt issues contain additional features, such as premium puts and embedded calls. In these circumstances, it might be difficult to apply the solution proposed above, but

Figure 1
Probabilities associated with redemption and conversion assuming a normally distributed share price



it will also be difficult to compute the straight debt value as illustrated in the Appendix to IAS 32. It may be hypothesised that the standard setters have intentionally restricted the complexity of this problem in an omnibus standard.

One further point needs to be stressed. The proposed solution in this paper does not address those liability recognition contexts which are not associated with observable market price behaviours (e.g. changes in the share price).

6. Probability of conversion in accounting pronouncements

6.1. Accounting for Compound Financial Instruments

As discussed above, there are two alternative treatments of the probability of conversion and its role in accounting for compound financial instruments in accounting standards. First, UK standard setters, after due consideration, have rejected any role for the probability of conversion in the reporting context. FRS 4 requires the compound instrument to be reported as debt over its entire life.

Second, IAS 32 and AASB 1033 require the reporting entity to dichotomise the compound instrument into its debt and equity components at the date of issue. The value assigned to the equity component reflects the probability of conversion at that date. Under the no-revision rule, changes in the probability of conversion in either direction in subsequent years are ignored.

6.2. Reporting Earnings per Share

Generally, the professional accounting standards typically require basic earnings per share (EPS) to be calculated by dividing the earnings of the company for the financial year by the weighted average number of ordinary shares outstanding, and diluted EPS to be calcuated by dividing the sum of earnings and interest on the convertible notes by the sum of the weighted average number of shares and convertible notes outstanding.

For example, SSAP 3 (amended, ASB, 1992c), IAS 33 (1997), and (US) SFAS 128 (1997), each entitled *Earnings Per Share*, adopt this approach. In other words, in computing basic EPS, it is assumed that no conversion will occur, irrespective of whether the probability of conversion is high or low; and in computing diluted EPS it is assumed that full conversion will occur, irrespective of whether the probability of conversion is high or low.

On the other hand, the Australian standard, AASB 1027 *Earnings Per Share* (1992) does take the probability of conversion at the reporting date into account in calculating diluted EPS. If and only if there is a probability of conversion of the notes into ordinary shares, then the numerator will comprise the sum of earnings, interest on the convertible notes and imputed after-tax earnings on funds available from conversion, and the denominator will comprise the weighted average number of *potential* ordinary shares outstanding. AASB 1027 provides guidelines on the factors that should be considered in determining the probability of conversion.

IAS 32 will not be consistent with the treatments accorded to basic EPS or diluted EPS in any of the accounting standards described above. Its decomposition approach is based on a conversion feature, which reflects the probability of conversion as at the date of issue.

7. Summary and conclusion

This paper has addressed the following issues. An important issue is the felt necessity that where a standard has departed from the thrust of the CF, the standard setters should be obliged to disclose the inconsistency and explain their reasons for this particular action. In the context of compound financial instruments the present writers have noted that the definition of a financial liability in IAS 32 is inconsistent with that of a liability in the CF.

Reporting a convertible debt at current or market value is not feasible. While arguments can be offered for measuring and reporting certain assets and liabilities at current or market value, this measurement rule cannot be extended to the equity component in a compound financial instrument. Thus, it would appear that a convertible debt should be measured and disclosed at its historical amount. IAS 32 requires a compound financial instrument to be classified into its debt and equity components as at the date of issuance and reported thereafter at these pre-determined historical amounts. Criticisms of these requirements are offered in Section 3.

The present writers have proposed that it might be more appropriate to conceive of a convertible debt as a single financial instrument with a dual nature, comprising the nature both of liability and equity. Under this concept, the instrument cannot be decomposed into severable component parts; rather it can be said that its liability nature or equity nature is dominant at a particular time. The accountant's problem is to identify which is the dominant nature and classify the instrument accordingly for external reporting purposes.

An important issue concerns the use of the term 'probable' in the liability concept. Probability is a core concept in the definition and/or recognition of elements in the CF, but it is ill-defined and the problem of operationalising this criterion has not been addressed. This omission becomes starkly evident in the flawed approach to accounting for compound financial instruments. A top priority for standard setters is to clarify the probability concept in an accounting context and develop a suitable probability criterion.

In the final analysis the issue is whether the standard will result in a true and fair view being presented in the financial statements. There are a number of interpretations of what constitutes a true and fair view. The US and Australian interpretation is that the application of accounting standards results in financial statements that are true and fair, but the preparer may be required to provide additional information in order that financial statements are not misleading.

An alternative, British, view is that financial statements are true and fair if they contain what a reasonably knowledgeable user would expect to see, given the facts and present-day accounting practice. If a convertible debt were reported as having, say, a 90% liability component when the probability of redemption is in fact low, then under the first interpretation of a true and fair view it would be incumbent on the preparer to present additional information so that the financial statements are not misleading. Under the second interpretation the financial statements cannot be regarded as true and fair. Preparers might adopt an alternative approach, i.e. not apply the standard and indicate their reasons for not doing so in order to present a true and fair view.

There is one more issue. There is a global drive towards harmonisation with international accounting standards, and there is some evidence that IAS 32 will be embraced by various national jurisdictions in the interests of harmonisation. This paper has argued that the treatment of compound financial instruments in IAS 32 is flawed in several important aspects. There is, then, all the more reason for the international standard setters to revisit this standard without unseemly delay.

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Book Reviews

Accounting for Overheads: Critique and Reform. *Michael Bromwich.* Acta Universitatis Upsaliensis, 1997. 102pp. SEK143.

The purpose of this study is to analyse the relationship between accounting cost and technology. The need for this consistency between accounting and technology of an increased dynamic character is a major challenge to accounting. Without this consistency, accounting signals may become increasingly dysfunctional. A second purpose of the study is to find methods to reduce the number of resources and costs which are treated as fixed overhead costs in the traditional accounting system. An introduction to the analysis to be performed in the following chapters is given in Chapter 1. The main content of the book is contained in Chapters 2 and 3. Chapter 4 contains conclusions and recommendations.

Chapter 2 contains the assumptions on which the analysis is supposed to be based. The first part of the chapter is devoted to the analysis of the impact of the firm's technology on the cost structure. A three-way classification system is used in the present context: operational characteristics, supply characteristics, supply characteristics and managerial characteristics. Similarly, the factor markets are found to be of importance in understanding the cost structure.

Another dimension of the cost structure is the classification of resources into private and public. The issue of separability is shown to be central for this understanding; that is, decomposition of the cost function into several subcomponents is essential for the construction of easy to use accounting systems. The chapter is concluded by an analysis of the new trend in costing literature, ABC. It is shown that application of ABC requires that rigorous conditions of the production technology are satisfied. The essential features of ABC require linearity of resource consumption and separability of the cost function. Often these assumptions are neglected.

Some of the most difficult problems facing an accountant are analysed in also Chapter 3. That is, issues related to common and joint costs. Decision driven costs are discussed here. It is shown how understanding the production technology might help in assigning those types of costs to objects. One is to create a cost hierarchy such that costs are reported in the place in the organisation at which they become incremental. Other means are the use of either market pricing schemes or taxing schemes in the form of the opportunity costs constructs that can be obtained from mathematical programming approaches to the analysis of resource allocation. The full menu of these options is discussed. Finally, it is suggested that non-financial measures are important for planning and control of such resources.

Chapter 4 provides a summary of the findings, together with the implications of the analysis formed as recommendations for accounting reporting. The point in this chapter is that the accounting report should reflect the technological characteristics of the resources, and this is done through a hierarchy of costs. This way, resource requirements are linked to the variability of the factors causing the resource usage to vary. That is an old recipe; however, it is refined in this text to accommodate for the evolution of the production technology.

To summarise, it is a very important subject Michael Bromwich has analysed in this book. It is not an easy book to read. The structure of the underlying problems is important for understanding the findings, and often the structure of the production process becomes very complicated. The author has not used mathematics to convey his insights. That increases the audience for this book but at the risk that some of the complicated economic structure is not fully captured by the verbal description. However, studying this book is definitively worthwhile as the insights gained clearly outweigh the costs. The connection between technology and costs is important for the understanding and interpretation of accounting, and this book brings our knowledge of this one step further.

Odense University John Christensen

Linking Social Science Information to Policy-Making. *Cheol H. Oh.* Greenwich, Connecticut: JAI Press, 1996, xviii+201pp. ISBN 07623 0155 4. £49.95.

Cheol Oh's book is the tenth volume in the JAI Press International Series of Monographs in Law and Economics, History of Economic Thought and Public Finance. Oh's book contributes towards an expanding literature, predominantly US-based, on the evaluation of public policy and the role of social science research in policy decisions. In essence, the programme of this type of research is to explore under what conditions research information is most likely to affect the policy-making of governmental agencies.

The ambition of this particular example of policy evaluation is considerable in that Oh argues that earlier studies have lacked proper consideration of the 'impact' of social science information on policy which instead have tended to concentrate upon whether such 'information' has been utilised and processed in policy decisions. Moreover, Oh argues that much of the previous literature has offered only 'partial explanations' by adopting 'single perspectives' such as rational choice theory, information-communities study or organisation theory, whereas the present study offers a 'comprehensive conceptual framework' for information utilisation and a test of that framework. Against this background of high aspirations I should mention that the policy initiatives Oh investigates in this book to develop his framework are in the area of mental health.

Much of the book's first chapter develops the claim that policy evaluation studies are immature, both in theorisation and results, for the reasons outlined above. In Chapter two, Oh develops a brief critique of the concept of information or knowledge derived exclusively from the due procedures of 'scientific method'. Oh makes it clear that his usage of the term 'information' is to include also 'propositions, conjectures, statements and hypotheses'. Most of the book is concerned with the development of the aforementioned conceptual framework for information utilisation. Chapters three and four draw out from previous studies the key theories that have influenced policy evaluation studies and use them to develop an integrated model of the information utilisation and impact process. This model then includes environmental issues concerning the nature of the policy area, organisational characteristics which Oh takes to mean the position of decision-makers in the organisational hierarchy, decision-maker characteristics (personal motivations) and, finally, the characteristics of information, including its source, and 'ease of dissemination'. The key factors of the model are then linked structurally into a set of causal relationships and tied to factors likely to influence the impact of social science information (such as demographic factors and organisational characteristics).

Only at a relatively late stage of the book (Chapter four) is an account of the research itself offered. Oh tests his model against two policy areas in mental health: policies affecting the delivery of mental health services (political choices) and policies affecting the financing of mental health services (technical choices). Interviews with almost 500 federal, state and local policymakers from 18 states in the US were conducted. These included representatives from mental health agencies, community groups, legislators, pressure groups. The remaining chapters offer the results of tests of the model and conclusions/recommendations for future research. Oh constructs two path models, covariance models without latent variables, the first of which is 'tested', empirically and somewhat obscurely, against 'reality'; the second model is designed to test causality among the factors associated with the impact of information on decision making, using Ordinary Least Squares multiple regression for the continuous dependent variables, and maximum likelihood logistic regression for the dichotomous dependent variables. The results show that in both policy areas all factors play an important role in explaining the use of information in decision-making.

So the author's model appears to be validated, although to what end for the financing and delivery of mental health care is unclear. Indeed, the book could not be criticised for providing overwhelming detail, neither in terms of the nature of 'data' that is used to perform the path analysis nor the implications for mental health service in the US. The bulk of the book highlights, repeatedly, the need for an integrated model of information utilisation in policy-making and sets out what such a model might look like. Oh's results confirm his model, although in view of i) the vague understanding of what constitutes 'social science' information, ii) the highly general form of the 'factors' (the individual, the organisation, the information, the environment offered to account for information use and iii) the unclear relationship between the research interviews and the 'data' that forms the path analysis, the reader might be unsurprised by that.

Yet the book offers a diverting insight both into trends in North American policy analysis *post* Wildavsky and is, perhaps, of interest to those puzzled by the relationships between academic research in accounting and the profession's own policy-making process. Whatever reservations might be held about divorcing the concept of 'information' from knowledge of 'organisation' and 'environment', as if social science doesn't also inform us of our 'position' in an organisation or even our 'motivations', the ambition and breadth of the book offers ample scope for moving theorisation of the roles of accounting theory and practice beyond simple 'gap' theory. From this book there might be gained a more complex understanding of the dynamics of policy-making.

Manchester School of Management UMIST
Keith Robson

The audit society: rituals of verification. *Michael Power*. Oxford University Press, 1997. 183pp. £19.99.

In his preface, Power asks: 'So what, after all this is the "relevance" or "use-value" of this book?' Its relevance is that the book articulates fundamental concerns about the nature and usefulness of audit. It deals with a wide diversity of issues surrounding the audit and offers a rich and intricate interweaving of the concepts such as trust, culture, risk, accountability and democracy; raising more themes and ideas than can be consistently dealt with in one volume. The most significant contribution of the book is its questioning of whether audit can deliver its goals of control and transparency based on its imperfect technologies, and why audit itself is insulated from radical enquiry.

The main arguments of the book are not new—they were first raised in the author's seminal work on 'The Audit Explosion' (Power, 1994). The arguments here, however, have matured and are subject to a more subtle and extensive analysis. Power distinguishes between two elements of auditing: progammatic and technological. At the programmatic level auditing is part of the regulatory regime, a way of ensuring policy is put into effect while allowing the state to withdraw from regulation and from the 'murky plain of overwhelming detail' (p. 53). At the technological level, auditing is a set of techniques. Power suggests that the technological element is incapable of fulfilling the promise made at the programmatic level.

The emerging emphasis on governance is cited as an important influence on the programmatic demand for auditing; in particular with regard to improved accountability and the empowerment of stakeholders. Power discusses this in three overlapping contexts: the public sector, the Cadbury code, and quality and environmental audits. These introduce a major theme of the book: the emphasis that the audit places on internal control systems and auditable performance measures to replace or compensate for the difficulty of auditing real performance. Auditors attempt to make entities auditable through sampling, reliance on specialists and systems. Power argues that these methods are only 'loosely coupled' to the organisation's activities and so may not meet the audit objectives of giving assurance, improving compliance and stimulating best practice, and hence may become mere 'rituals of verification'.

The case studies show that 'systems with very similar general features are being developed in diverse contexts to provide an auditable surface for the organisation' (p. 114) and they illustrate how organisations interact with the audit process and ways that they benefit or suffer because of the audit. People within organisations may respond to the audit with a mixture of 'de-coupling' and 'colonisation' strategies. In the former case (decoupling) the audit is seen as primarily for legitimisation purposes. It is characterised by ritualistic compliance and the organisation may set up buffer structures (e.g. audit committees), to deal with the audit leaving the rest of the organisation largely unaffected.

Colonisation may occur because formal procedures become ingrained habits or because individuals welcome documentary proof of their activities and perhaps perceive the audit as helpful. Power believes that colonisation is difficult to achieve due to inherent professional conflicts, but it is possible that he dismisses it too quickly. This idea of individuals valuing feedback from the audit seems worth exploring—it could help explain why some professionals such as teachers, doctors and academics, despite initial reservations and tensions, enthusiastically embrace performance measurement and self-audits.

The concluding section of the book suggests implications for policy makers. These are almost incongruously pragmatic. Suggestions include the need for more reflection on the mix between internal and external audit and on the consequences of audit arrangements. Also mentioned is the need for sensitivity in deciding where audit or trust is appropriate in relation to different audits and auditees. Power even suggests that it may be possible to develop criteria, performance indicators perhaps, by which audit could evaluate itself, although he does admit that this might be '... an ironic extension of auditing and a further step towards the audit society?' (p. 144).

The most frustrating aspect of the book is that it never defines audit. Power argues throughout that 'it is precisely this fuzziness in the idea of auditing that enables its migration and importation into a wide variety of organisational contexts' (p. 86). Despite this, he does define some boundaries for audit, for example distinguishing audit from surveillance and inspection. In general, the understanding of 'audit' is narrower in this book than it was for the 'audit explosion' (Power, 1994), which also placed emphasis on performance measurement and inspections. The emphasis here is mainly on the influence of financial auditing as a powerful model for other auditing practices. There is little discussion of emerging audit technologies that merge with performance measurement and inspection, and which may provide a greater accountability challenge.

These evolutions in Power's thinking detract significantly from his claims for an audit society; or at best offer an impoverished view of an audit society. The type of audit Power discusses is often remote from society. He discusses in some detail how financial auditing techniques have extended out into many areas, but the view of audit as an idea, which has come to permeate all our lives, is very much a secondary theme. By considering the inspection and performance measurement elements, in addition to the audit elements, we can see the extreme effects of the audit society that touch the lives of both the public and the professionals. Despite their limitations, league tables and schools inspections are highly visible and threatening to the professionals and are perceived to provide useful insight for stakeholders.

If we take 'checking' or 'monitoring' as the defining characteristic of an 'audit society' then inspection and performance measurement are important parts of that society. In fact, it could be argued that audit is but one aspect of a 'performance measurement society'.

Power concludes that 'this book is not intended as the final word, and I shall be content if others find it useful, interesting and provocative' (p. 143). It will undoubtedly fuel academic debate, and provides the crucial foundation from which the audit society, its drivers, obstacles, strengths and limitations can be further explored and debated by practitioners and researchers.

Reference

Power, M. (1994). 'The Audit Explosion'. DEMOS, paper no. 7.

University of Sheffield Mary Bowerman

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Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelled with an 's' not a 'z'. Single quotations marks should be used, not double.

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Mathematical notation should be used only where it adds rigour and precision, and should be properly explained in the text. Equations should be numbered in parentheses, flush with the right-hand margin.

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The market for information—evidence from finance directors, analysts and fund managers

Richard G. Barker*

Abstract—The theoretical distinction between information efficiency and fundamental efficiency suggests an important question for accounting research, which is whether (and to what extent) there exists an equilibrium mechanism whereby fund managers' investment decisions can be fully informed. This question is approached in this paper by means of developing a grounded theory of the market for information. The theory is derived from a (mostly interview-based) empirical analysis of the economic incentives of finance directors, analysts and fund managers with respect to stock market information flows. The evidence suggests a two-part theory. First, it is argued that 'raw' data flowing directly from companies is of considerably greater importance to fund managers than 'processed' data generated by analysts. Second, analysts are nevertheless argued to play an important role in the market for information, as both mechanisms of information efficiency and as providers of benchmarks for consensus valuation. This theory implies that the research literature has paid insufficient attention to the role of accounting information in direct communication between companies and fund managers and, related to this, that the role of analysts in share price determination has been overstated and only superficially understood.

1. Introduction

This paper develops a grounded theory of the market for information, based upon an empirical analysis of the economic incentives of finance directors, analysts and fund managers with respect to stock market information flows. Section 2 of the paper identifies limitations in the concept of information efficiency and introduces the market for information as a theoretical framework for addressing these limitations. Section 3 outlines research questions for the paper, Section 4 reviews prior research, and Section 5 describes the research methodology employed. Sections 6, 7 and 8 present and discuss research findings with respect to finance directors, analysts and fund managers, respectively, and Section 9 concludes the paper by developing the grounded theory and deriving implications from it.

2. The market for information

Fama's (1970) efficient market is a model which appears, *a priori*, to fit the stock market well. Information on prices, news items, financial statements, and so on, is simultaneously available at low cost to most stock market agents, who respond to it in a rapid and highly competitive manner. It would be surprising, therefore, if there were any significant inefficiencies in the stock market *with respect to the information that is made available to it.* The efficient markets hypothesis (EMH) is, however, silent on two centrally important aspects of this availability. The first is the quantity and quality of information with respect to which the market is efficient, and the second is the equilibrium mechanism[1] by which the market becomes efficient. In other words, because the EMH is concerned solely with a positive description of *information* efficiency, it ignores the important normative issue of how the market might move closer to *fundamental* efficiency (which arises if stock market prices perfectly anticipate future outcomes). This distinction between these two concepts of efficiency is important for policy-relevant research because of the likelihood that value-rele-

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[1] An 'equilibrium mechanism' is taken here to mean the process of information transfer and analysis that leads to trading decisions, and thereby to price information.

vant information exists that is not impounded in share prices—either because it is not made available, or because it is not processed correctly.

Market-based research in accounting is methodologically reliant upon the EMH, and it therefore shares the limitations outlined above. Its focus has been on a narrow, positive concept of information usage, which is that of reflection in either share prices (see, for example, Beaver (1989) for a review) or in analysts' earnings forecasts (e.g. Abarbanell 1991, and Elgers and Murray, 1992). It has also tended to rely on assumptions, rather than on direct tests, of the market's equilibrium mechanism.[2]

A theoretical framework for examining information availability and usage is provided by Gonedes (1976), who notes that the characterisation of the stock market as efficient imposes assumptions regarding a second, and conceptually distinct, market, which is the 'market for information' (see also Keane, 1983). The significance of this distinction is that if the market for information fails to make information available to the stock market, and if the information that it does provide is incorrectly processed, then even an informationally efficient stock market would fail in its primary function of efficient resource allocation.

Moizer and Arnold (1984) identified two centrally important interest groups within the market for information, which are firms of stockbrokers (hereafter 'analysts') and fund management firms (hereafter 'fund managers'). The analysts do not buy and sell shares on their own account. Rather, they are specialist advisers who seek and process information and then 'sell' it to fund managers. In turn, the fund managers are responsible for buying, holding and selling shares, and thereby determining share prices. They rely on advice from the analysts and, in addition, they utilise information directly from companies and other sources.

If we add analysts and fund managers to the public companies whose shares are traded on the stock market and who, therefore, supply the market for information, then we have the tripartite structure shown in Figure 1.[3] An economic description of this structure needs to differentiate information flows between, on the one hand, companies and both analysts and fund managers and, on the other hand, between analysts and fund managers themselves. As shown in Figure 1, the first of these information flows may be termed the 'market for financial reporting', and the second the 'market for financial analysis'.

3. Research questions

Fund managers make investment decisions that determine share prices. Central, therefore, to an understanding of the market for information is the question whether (and to what extent) there exists an equilibrium mechanism whereby fund managers' investment decisions can be fully informed. This question concerns both of the markets for information that are shown in Figure 1.

Looking first at the market for financial reporting, there is a potential under-provision of information caused by shareholders' incentives to 'free-ride' (e.g. Bromwich, 1992). Alternatively, market failure might be averted if finance directors (FDs) themselves have the incentive to supply information to shareholders (e.g. Watts and Zimmerman, 1986).

Empirically, FDs' actual incentives regarding information disclosure can be examined as follows. First, we need to understand why and to what extent the share price is important to FDs, since this determines their incentives with respect to informing the market. Second, we need to understand FDs' perceptions of whether or not the share price is efficient (in both the strong and the semi-strong sense), since this affects how much the FDs believe they can influence prices. Finally, we must consider how FDs perceive the process by which disclosed information is communicated and processed, because this is central to the way in which they believe that valuation-relevant information can be conveyed.

In contrast to the market for financial reporting, information is commercially traded on the market for financial analysis. This implies that (within a competitive markets framework) the cost of the analysts' information service must be equated at the margin to a benefit to fund managers.[4]

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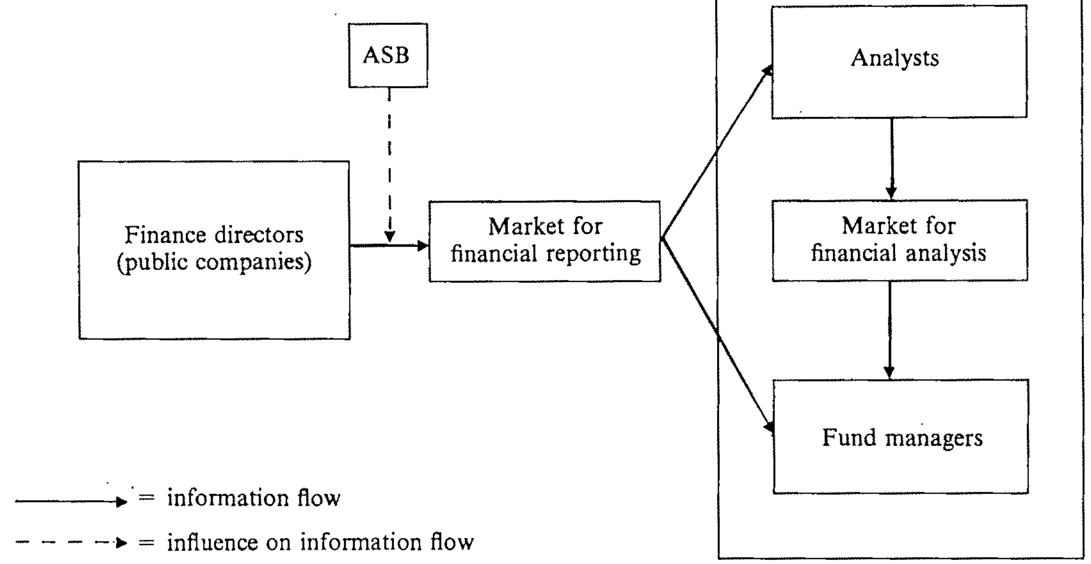
[2] The most commonly assumed equilibrium mechanism is the competitive activity of security analysts—see Foster (1982), Schipper's (1991) review article, and also Grossman and Stiglitz (1980).

[3] Note that: (1) a fourth interest group is the Accounting Standards Board (ASB), whose role as the regulator of financial reporting is indicated in Figure 1; (2) the public companies are represented by their finance directors (FDs), who are the main point of contact with the market for information and who supply accounting and other information to it; (3) Figure 1 is a stylised version of the market for information, and it ignores other participants such as financial media and the government; (4) fund managers act on behalf of shareholders and are not themselves 'true' principals—indeed, there is an agency relationship between fund managers and shareholders, as noted in Moizer and Arnold (1984). This observation does not, however, affect the substance of the argument presented in this paper.

[4] It may be noted here that the concept of market efficiency is statistical rather than economic, since it is concerned only with the correlation between information sets and prices, rather than with the relationship between the benefit to be derived from information compared with the costs of obtaining it (Ball, 1990). There is no conflict between the statistical and the economic viewpoints if information costs can be assumed to be zero, but recognition of the role of analysts as information processors forces an economic interpretation.

Figure 1
The market for information


ASB
Finance directors (public companies)
Market for financial reporting
Analysts
Market for financial analysis
Fund managers
= information flow
= influence on information flow

It is possible that analysts' value added arises because the direct supply of information from FDs to fund managers is inadequate. In this context, fund managers may rely on analysts to generate information from sources other than the market for financial reporting, such as industry or economy data. Alternatively, analysts may be relied upon to provide a skilled and independent interpretation of company-sourced information. Another possibility is that there are economies of scale in information processing, which are available to analysts but which cannot be captured by fund managers.

An empirical answer to these (and to other) competing possibilities needs to address the economic incentives of both analysts and fund managers, together with the demand for information that is derived from these incentives. More specifically, we need to understand the nature of analysts' incentives with respect to the service that they supply to fund managers, and also fund managers' investment objectives. We need also to understand the types of information sources that analysts and fund managers find useful, together with the reasons for their preferences. The answer to these questions will help us to understand the effectiveness and the relative importance of the markets for financial reporting and financial analysis, and will thereby enable us to address the question whether, and how, fund managers' investment decisions can be fully informed.

The research findings with respect to the questions raised here are reported below, after first reviewing prior research (Section 4) and outlining the methodology used to collect data (Section 5).

4. Prior research

Prior research has addressed some of the questions raised above, although there are also important omissions.

With respect to the supply of information by companies, it has been found that the propensity to voluntarily disclose information is positively related to firm size and to equity issuance (e.g. Lang and Lundholm, 1993). The evidence is mixed, however, on the relationship between voluntary disclosure and financial performance (e.g. Lev and Penman, 1990, and McNichols, 1989), although Skinner (1994) finds that the market response to negative earnings surprises is greater than that to positive surprises, and that managers are more likely to voluntarily pre-empt the former than the latter. This evidence on voluntary disclosure has recently been extended by (for example) Marston (1996) and Holland (forthcoming), who use survey approaches to analyse the channels of communication used by companies to inform the stock market.

With respect to the demand for information, a number of UK studies have examined the information sources used by stock market participants (e.g. Lee and Tweedie, 1981, Arnold and Moizer, 1984, and Pike et al., 1993, Table 2). The important distinction between analysts and fund managers is rarely drawn, however (though see Moizer and Arnold, 1984), and there has also been little attempt to explain, in the light of the economic incentives of analysts and fund managers, the underlying reasons *why* the identified information sources are preferred and, further, the mechanisms by which they are used. These important omissions are addressed in this paper.

A final, and important, observation to make with respect to prior research is that there has not been a combined study of finance directors, analysts *and* fund managers. This is in spite of the fact that the behaviour of any one group will inevitably be influenced by that of the other two. The evidence in this paper therefore offers a unique opportunity to develop a grounded theory of the market for information based upon evidence concerning the interactions between each of the major constituent groups of the market—addressing, for example, the relative importance to fund managers of analysts versus finance directors as sources of information.

5. Research methodology

As indicated above, this paper does not aim to test predetermined hypotheses but, rather, to develop a theoretical framework within which to understand stock market information flows. In this sense, the paper may be seen as a development of grounded theory (Glaser and Strauss, 1967). This is an approach which enables the researcher to take a broad view of a subject that has not previously been well understood (in this case, the market for information) and then to derive theory based upon observation.

The primary research methodology was that of semi-structured interviews.[5] These have the major advantage of allowing interviewees to express opinions on wide-ranging, predetermined issues, and also in response to supplementary questions seeking clarity, consistency and full explanation. Against these benefits are potential problems of subjectivity and bias in the data and in its interpretation. In addition to interviews, initial research conducted with analysts made use of both participant observation and questionnaires.[6] Participant observation was used to gain first-hand experience of both the environment in which analysts operate and of the work that they do (see also Gniewosz, 1990). Such experience was informative in its own right as well as being invaluable in guiding the subsequent design and interpretation of questionnaires and interviews. In turn, questionnaires were used in this study as an 'intermediate step' between participant observation and interviews. They were used both to clarify and quantify the findings of participant observation, and also to suggest areas for further investigation in the interviews, although they did not have the same scope as interviews for in-depth analysis.

Sample selection in this study reflects an interest in public companies and in firms of analysts and fund managers whose actions are material to share price behaviour. This included (for example) FDs whose companies are sufficiently large to have a well-developed market for information, as well as analysts who are market-leading rather than 'typical'. Specific details of sample selection and fieldwork are presented in an Appendix to this paper.

In summary, empirical evidence is based upon participant observation (one month with a firm of analysts), questionnaires (42 from analysts), and interviews (40 with finance directors, 32 with analysts and 39 with fund managers). The sample of FDs represented more than 50% of the value of the FT-SE 100, while seven of the nine leading firms of analysts were included, and the fund managers represented approximately 24% of the value of UK equities under institutional management.

6. Research findings—finance directors

As suggested by the research questions outlined above, this section of the paper addresses finance directors' incentives with respect to the market for financial reporting, as well as their perceptions of the information that they supply to this market.

The finance director interviewees were almost unanimous in their opinion that the share price is of considerable importance. Only four FDs (10%) considered that it was of only some importance, and one regarded it as unimportant. This general level of concern is reflected in the level of interest in share price changes. Each FD in the sample keeps in touch with daily price movements and will, in almost every case, seek explanation of a material movement, or else will automatically receive a report from the company broker. For 80%

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[5] The preference for a behavioural research methodology follows from the above discussion of the EMH. In particular, because a market-based test is necessarily based upon information actually used by stock market participants, it is methodologically unable to address the hypothetical issue of what information might potentially be used. Equally, while a market-based approach is able to tackle specific, well-defined issues concerning information flows, it is not well suited to simultaneously tackling a range of issues, such as those identified in Section 3 above.

[6] The fieldwork conducted with analysts was more extensive than that with either FDs or fund managers. This was for two reasons: (1) analysts physically occupy the 'middle ground' in between the other two groups, and they are therefore an obvious base for exploratory work, notably for participant observation; (2) the research literature suggested a focus on the role of analysts (e.g. Schipper, 1991).

of the sample, longer term trend price performance is of greater concern than shorter term volatility, which implies that the zero sum game of trading shares is of less concern than the return over time to the shareholders in aggregate. The FDs claimed to have a reasonable understanding of the determinants of this longer term performance. In contrast, short term volatility is not necessarily understood, and it is only really of importance when backed by high volume and/or by a significant news event or rumour.

The most common benchmark against which the share price is monitored is the movement relative to the sector, and this is especially the case where the sector is relatively homogenous and competitive. This shows an understandable concern for company-specific price changes and, more generally, for peer group competition. Of lesser, but nevertheless material, importance are movements relative to the market and performance in absolute terms.

When asked to articulate the reasons *why* they are concerned about share price performance, FDs offered a range of explanations. The most common response was expressed by 27 FDs and related to some notion of shareholder returns, with capital gains being placed alongside dividends as the primary measure of management performance. The other two areas frequently referred to were the threat of takeover (18 FDs) and the raising of equity finance (16 FDs). Significantly, both of these reasons were often justified, either explicitly or implicitly, by reference to shareholder value—in the former case because current shareholdings might be acquired for less than their true value, and in the latter because this value would be diluted by the issue of new equity at a low price. In this context, share price volatility is undesirable because it can have the effect of increasing the cost of capital, risking takeover, or lowering the cash inflow from equity finance. Each of these is important for long term value.

As might be expected, under-valuation is a greater concern than either unbiased share prices or over-valuation. This follows logically from the preceding paragraph, since under-valuation increases both takeover risk and the cost of equity finance, while over-valuation reduces both. There was certainly not, however, a lack of concern for over-valuation, and three reasons were offered for this:

- there was a general belief that the share price will sooner or later return to its trend level, such that there are no enduring benefits in being over-valued;
- in the case of both larger companies which are somewhat less concerned with takeover risk, and cash generative companies with no need of equity finance, there is little benefit in the share price being anything other than accurately valued;
- a reason mentioned by seven FDs was that the company has an obligation under stock market regulations to ensure that there is no material false market for the shares.

More generally, 10 FDs discussed the importance of the share price as a form of 'performance feedback' from the stock market, which affects broad perceptions of the company and thereby relationships with customers, suppliers and employees. Finally, nine FDs also mentioned personal interests in the form of the impact of share price movements on the value of stock options.[7]

Overall, this analysis suggests that finance directors certainly are concerned with their share price. It follows that their belief or otherwise in market efficiency is important, because this belief concerns whether and how they perceive that they can influence their share price.

The interview evidence indicated that most of the FDs perceived the stock market to do a fairly good job of valuing shares. Valuations were considered to be good or better by 16 FDs and reasonably good by a further 14, while six regarded them as no better than okay and the remaining four felt that they were poor. These perceptions may be examined further by considering the FDs' assessment of three underlying factors. These are: first, the analytical ability of analysts and fund managers; second, the quality and quantity of information supplied by FDs; and, third, the time horizons of FDs relative to analysts and fund managers.

Regarding the first of these factors, the FDs differentiated analysts into the 'leaders' and the 'pack'. Typically, there are about half a dozen leaders in any market sector. They were rated as either excellent or very good by 16 FDs, while 17 rated them as good, and six considered them no better than okay. Only one considered them poor. In contrast, the followers were not as highly thought of, but then they were also not considered very influential in the market and therefore not an adverse influence on the 'accuracy' of valuations. Opinions on fund managers were less strongly expressed, most often because they were regarded as generalists rather than as specialists.

For the most part, FDs seemed well disposed towards the fund managers, and were satisfied with the analysis and understanding of both the buy-side analysts and the fund managers themselves. Some of the FDs interviewed did raise some (mostly) minor reservations regarding information usage, and these generally concerned either detailed aspects of accounting information or the integration of non-accounting information into valuations. As a general conclusion, though, the evidence here supports the view that FDs believe the market to be informationally efficient.[8]

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[7] Stock options may have a significant *indirect* effect on share prices because they help to align the interests of management with those of shareholders. The *direct* effect on shareholder value of the cost of stock options is, however, small. This may explain why, in the context of stock market valuation, only nine FDs referred to them. An alternative explanation, however, is response bias.

With respect to the more general issue of fundamental efficiency, FDs were asked what information they could provide that would improve market valuations. A majority (27) considered that the information in the public domain is sufficient to do a reasonably good job of valuing shares, subject to inherent uncertainty and to constraints on disclosing competitively sensitive information. In fact, the important issue was generally claimed not to be the information itself but the effort expended in ensuring that it is clearly understood and that the key valuation messages are conveyed. Indeed, extra disclosure might even be detrimental to the process because it hides the wood further in the trees.

A further issue concerning fundamental efficiency is the time horizon of FDs, when compared with those of analysts and fund managers. A first observation in this context is that analysts were generally (though not universally) regarded as having a somewhat shorter time horizon than fund managers, due to their commission-based incentives. In turn, fund managers were generally perceived to have a time horizon not too dissimilar from that of the FDs themselves. Overall, a mere 10% of the sample considered that analysts and fund managers, taken together, have a markedly shorter time horizon than FDs, and a further 35% considered that there is some degree of a shorter term outlook. The remaining 55% firmly rejected the notion of short-termism and argued, for example, that the share price would suffer if there was an unexplained reduction in R&D activity or a failure to demonstrate that a long term strategy was in place. The general opinion was that the onus is on FDs to rise to the challenge of explaining longer term strategy, and short-termism seems likely to arise only when they fail to meet this challenge.

Further evidence that reinforces the FDs' perception of their role as communicators is that all of the interviewees considered themselves to be very important information sources (in agreement with the findings of Marston, 1996). This was less the case for companies where either macro-economic factors are of particular importance in driving the share price, such as oil and insurance, or where the differentiation between companies in a sector is not great, such as electricity. In each case, though, the relative valuation of a company within a sector was thought to rely heavily upon information from the company itself.

This information is communicated in a number of ways, and for each company the investor relations process is ongoing and has a regular annual cycle. This cycle will encompass at least two (and sometimes four) results announcements, which are typically followed by open meetings with analysts, fund managers and the press. Some weeks after the announcement of the final results for the year, the annual report and accounts is published, and this is followed by the AGM. Throughout the year, the company (usually represented by the finance director and the chief executive) will have a series of one-to-one meetings with major institutional shareholders. Typically, there will be between 20 and 40 of these meetings. There will also be some *ad hoc* contact with analysts (and some with fund managers) throughout the year. The nature of this contact varies significantly between firms, but may take the form of organised site visits and business presentations, telephone conversations, feedback on analysts' reports, and so on. Finally, the company will make periodic announcements to the stock exchange and to the press, in the form of (for example) a profits warning or news of an important business development. In each of these different forms of communication, there is acute awareness of the requirements of securities legislation concerning price-sensitive information (see also Holland and Stoner, 1996, and Marston, 1996).

It is clear that considerable time and effort is committed by senior management to the process of keeping the market informed. An extremely important axiom of this process, which was underlined by most FDs in the sample, and which arises because of the dynamic and strategic nature of shareholder communications, is that there should be 'no surprises'.[9] This arises from a recognition that investor relations is a long term process and that the market will discover bad news sooner or later. If bad news is temporarily concealed, then its ultimate release will cause the share price to fall because of both the news itself *and* because of an increased information risk (i.e. higher cost of capital) due to the FD's loss of credibility as an information supplier—an outcome that the FDs were keen to avoid.[10]

In this context, 80% of the FDs believed that the announcement of final results is of significantly greater valuation relevance than the publication of the annual report and accounts, and a further 13% considered it to be somewhat more value-relevant. This reflects the FDs' beliefs that the results announcements constitute news in the form of accounting information and an update on future prospects, while the annual report and accounts does not. This is seen in the striking paucity of questions asked of the company on release of the latter relative to the number asked on results days.

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[8] These findings are broadly consistent with Ashton, Crossland and Moizer (1992).

[9] 'No surprises' is used here to mean the minimisation of information asymmetry rather than the genuine anticipation of news.

[10] This evidence is consistent with Skinner (1994).

In the light of this relative unimportance of the annual report and accounts as a news event, FDs were asked what value it does actually have to the reader. The most frequently mentioned benefit was that it contains extra detail. Some 24 FDs raised this point, though few did so with any conviction. Indeed, most ruled out the actual valuation importance of this detail by explaining (as above) that the results presentation is designed to convey any messages of importance, and that it is essential for the credibility of communications that the annual report and accounts should contain no surprises.

It was clear, however, that FDs do not wish to do away with the annual report and accounts altogether, and a number of reasons were suggested for this. Some 15 FDs consider it to be important in communicating with the individual shareholder, while 12 regard it more generally as a public relations document, and 13 consider that it has value as a statutory document that provides 'negative confirmation' of information reported in results presentations and elsewhere. More generally, the annual report and accounts was regarded as the basis of a track record, which contains a comprehensive and public statement of both realised performance and stated objectives on a year-on-year basis. Although supportive in principle of the annual report and accounts, few FDs would object to a number of changes and modifications. Examples of changes suggested were the removal of some of the 'statutory clutter', such as the directors' report, together with a generally clearer focus on communicating with the user.

In summary, it was found that trend, relative share price performance, is very important to FDs, and that they consider there to be a considerable onus upon themselves to keep the market fully informed and to avoid negative surprises.[11]

7. Research findings — analysts

The first stage of research with analysts was participant observation, which took place within a UK research department in a brokerage firm that comprised 40 analysts, four of whom were generalists in market strategy and economics, and the remainder of whom specialised within individual sectors. An important overall finding from this work was that the primary objective of the host firm was to generate commission income. In essence, this was achieved by encouraging fund managers to trade by means of providing them with an analysis of mispriced securities.

Each of the market sector specialists followed similar working practices, particularly with respect to both new information that they received from companies and to information that they disseminated to fund managers. Regarding information from companies, a strong focal point in the analysts' calendar is the announcement of interim and annual results. These will typically arrive on screen at 7.30 am, and they are immediately examined for performance against expectations, together with any other implications for the share price. Some discussion with fund managers will typically follow, prior to an analysts' meeting given by the company in the late morning, which is itself followed by further discussion with fund managers and (usually) by the preparation of a report for circulation the following day. The writing of reports is an extremely important part of the analysts' work. The reports will typically be either a review of results, as described above, or else they will be the product of *ad hoc* pieces of company or sector research. They are an important marketing tool, in that they give the analyst exposure to fund managers and provide a basis for both telephone and face-to-face communication.

These general findings concerning the analysts' working environment were examined further in the survey research, which focused on the specific services that analysts aim to provide to fund managers and the types of information that they find useful. This survey research is reviewed below, with questionnaire responses generally reported first, followed by the related interview-based findings. This reflects the fact that the questionnaire responses were used in the design of the interviews.

Analysts in both the questionnaire and the interview surveys were asked what service they believe that they provide to fund managers. Each of the categories in Table 1 was ranked from 1 to 8 in order of importance (1 being the most important).

The first six of these categories all require the analyst to provide fund managers with something more than just public domain information. In contrast, the final two categories characterise analysts as simple channels through which public domain information flows. It is clear from all three average ranks given to these final two categories and, in particular, from the highly significant Wilcoxon tests, that analysts see themselves as 'adding value' through the skilled interpretation of information. The results are less clear, however, on what this skilled interpretation consists of. In notable contrast to the assumptions made in the research literature,[12] analysts themselves do not regard the

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[11] See also Holland (forthcoming) for corroboratory evidence on the importance of keeping the market informed, using both 'private' and 'public' information channels.

[12] See, for example, Bhaskar and Morris (1984), Patz (1989), Lys and Sohn (1990) and Capstaff, Paudyal and Rees (1995).

Table 1
Analysts' service to fund managers

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median rank	Modal rank
Informed analysis of specific companies	0.58	2.74	3	1
'Value added' ideas & analysis - original research	0.15	2.93	2.5	1
Profitable recommendations	0.72	3.45	3	1
Informed analysis of the industry	0.03	3.56	3	2
Accurate earnings forecasts	0.17	4.40	5	5
Informed views on events	0.00	4.92	5	6
Frequent market update	0.02	6.77	7	7
'Database' service - information supply on request	—	7.22	8	8

Kendall's coefficient of concordance: W=0.49; Significance=0.000. Sample size=70.

accuracy of their earnings forecasts as the benchmark against which they should be assessed. Indeed, this category is ranked fifth, and it is differentiated at the 3% level from the fourth-ranked category.

The top four categories are closely ranked. Three of them may, however, be similarly interpreted. These are the informed analysis of specific companies and of the industry, and 'value-added' research. Taken together, the high ranks for these categories suggest a belief held by analysts that fund managers want advice that informs decision-making, rather than specific recommendations or forecasts.

At first sight, this conclusion does not sit easily alongside the high ranking accorded to profitable recommendations. On closer inspection, though, we find that the responses for profitable recommendations have an unusual distribution. While 16 analysts made this the highest ranked category, the second most common ranking was fifth (11 analysts). A tentative hypothesis suggests itself here, namely that the sample can be split into two types of analyst. We may call these 'advisers' and 'recommenders'. The advisers are those who ranked first either original research or informed analysis of specific companies (or of the industry). They represent approximately two-thirds of the sample. In contrast, the recommenders, who ranked first either profitable recommendations or accurate earnings forecasts, account for the remaining third.

A final, important feature of the service that analysts provide is that it focuses on the market sector in which they operate. Four of the analysts who were interviewed claimed to concentrate only on the relative values of stocks within their sectors. In contrast, the remaining 28 consider that they have an (albeit secondary) role in assessing the value of their sector relative to that of the market as a whole. Most analysts are therefore likely to find industry-specific information useful. The implication of Table 1, however, is that they find company-specific information more useful. This interpretation is supported by Table 2, which reports questionnaire responses on a five-point scale concerning the importance of different information sources. For purposes of comparison, Table 2 also reports the findings of similar research.

The strongest conclusion from this data is that the company itself is overwhelmingly the most important source of information to the analyst. Each of the top categories is sourced from the market for financial reporting. In particular, direct contact with the company is the top-ranked category, and it is significantly different at the 2% level from the second-ranked.

A striking result (which may also be subject to most bias) is the exceptionally low ranking given to the reports of other brokers. On the literal interpretation that analysts may not see their competitors' output, this result may be reasonable. It was clear from participant observation, however, that analysts are aware of the consensus earnings forecasts, and it is also improbable that conversations with fund managers do not (implicitly, at least) reference the opinions of others.

Probing further into the importance of the market for financial reporting, the four categories in Table 3 were ranked by the analysts who were interviewed.[13]

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[13] This demonstrates that interviews can be used to explore questionnaire findings more thoroughly. Note also that the responses are reassuringly consistent between the questionnaire and the interview.

Table 2
Analysts - sources of information

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median value (1-5)	Modal value (1-5)	Lee & Tweedie 1981	Arnold & Moizer 1984	Pike et al. 1993
Direct contact with the company	0.02	2.87	1	1	3	3	1
Analysts' meetings	0.11	4.00	1	1			2
Results announcement	0.92	5.19	2	2			4
Annual report and accounts	0.33	5.29	2	1	1	1	3
Industry contacts	0.65	5.99	2	2			
Interim report and accounts	0.02	6.31	2	1	2	2	
In-house economics	0.53	8.63	3	3			
Industry information services	0.96	9.02	3	3	4=	4=	5
In-house strategy	0.33	9.19	3	3			
Clients	0.75	10.08	3	3			
Sales desk	0.22	10.42	3	3			
AGM	0.81	11.49	3.5	3			7
Market news	0.17	11.67	3	3			
In-house technical analysis	0.97	12.62	4	4			
Companies house	0.93	12.65	4	3		7	
Newspapers	0.00	12.96	4	4	4=	4=	
Reports of other brokers	—	14.62	5	5		4=	6

Kendall's coefficient of concordance: W=0.53; Significance=0.000. Sample size=42.

Personal contact is significantly more important at the 9% level than results announcements and analysts' meetings which, in turn, are more important at the 1% level than the report and accounts. Finally, the relative importance of the report and accounts and of organised visits and presentations cannot be established with confidence, and both are therefore of approximately equal least importance.

Follow-up questioning in the interviews suggested that personal contact was ranked highest for four main reasons. First, it is the most timely of the four information sources. Second, it allows the analyst to ask the questions that he or she wants to ask, and it is therefore a more direct and efficient method of data collection. Third, it allows the possibility of gaining a competitive advantage over rival analysts, by means of probing for an interpretation of public domain information. Finally, it enables a focus on strategic and other forward-looking issues affecting current market value. This is in contrast to the less helpful view provided by historic information (though see Weetman, 1994).

Table 3
Analysts - sources of information direct from the company

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median rank	Modal rank
Personal contact - by phone, writing or individual visit	0.09	1.59	1	1
Results announcements and analysts' meetings	0.01	2.07	2	1
Report and accounts	0.36	3.04	3	4
Organised site visits and other presentations for groups of analysts	—	3.30	3	4

Kendall's coefficient of concordance: W=0.39; Significance=0.000. Sample size=32.

Table 4
Fund managers - performance benchmark by client type

	Benchmark	Time period over which benchmark is assessed
Pension funds	WM/CAPS[17] Median	Rolling 3-5 years
Life assurance	FT-SE-A All-Share Index	N/A
Unit or investment trusts	Category peers	1 Year

[17] WM and CAPS are the two main providers of survey-based information on pension funds under management in the UK.

Results announcements and analysts' meetings ranked highly because they represent timely updates on a company's performance.[14] They are the analysts' first opportunity to absorb any element of 'news' in the financial statements, such as final trading results or exceptional items, and they also include a review of the results, together with indications of performance sustainability. The report and accounts, in contrast, received a relatively low ranking, primarily because it is not a timely source of information and so doesn't satisfy the analysts' short-term 'news' orientation. This does not imply that accounting information is unimportant but, rather, that its usefulness is better reflected by the results announcement than by the report and accounts. Furthermore, accounting information may also be an important feature of both personal contact and of organised visits and presentations.

Some further, general insight into the role of accounting information was gleaned by some of the interview questions, as follows. Three-quarters of the analysts (24) believed that the level of disclosure of accounting information is broadly sufficient. By this it is meant that, subject to any inherent limitations in the value-relevance of accounting information, there are no obvious, major deficiencies in disclosure. It was also the case, though, that a clear majority of 26 to six perceived that firms differ in the quality of accounting information that they provide. This was generally considered to be a matter of the level of disclosure, as opposed to the method of presentation or the basis of measurement.[15]

In summary, analysts are motivated by the maximisation of turnover in shares, and they perceive themselves to offer a value-added service to fund managers that is mostly company-specific, that is not (in most cases) focused on recommendations and earnings forecasts, that relies heavily on the company itself for information, and that depends critically upon a rapid response to new information (such as the results announcement).

8. Research findings—fund managers

The primary objective for all of the fund managers who were interviewed was the maximisation of returns versus a given benchmark, with the specific choice of benchmark varying according to client type (see Table 4). There is a greater variation of benchmarks within pension funds than within life assurance funds, because the former are tailored to the investment objectives of individual clients.

There was unanimity among fund managers that the benchmark is fundamental to asset allocation and stock selection. Performance objectives will invariably be stated in terms of outperforming the benchmark, or, more specifically, of being in the top quartile or third of all funds. The target is therefore relative and, needless to say, no more than one in three funds can achieve it in a given year. In practice, it is important for the under-performers that their realised performance does not deviate too far from the achievers, implying that the control of risk relative to the benchmark is critical. Evidence of this can be found in the small deviations in asset allocations between firms. UK equities accounted for approximately 54% of pension fund allocations at the time of the interviews (PDFM, 1996), and most of the pension fund managers claimed that their firm deviates from this by only 1 or 2% (or, exceptionally, up to 5%). The asset allocation decision is usually 'top-down' and outside of the domain of the UK equities fund managers, whose decisions are made at the sector and stock levels. For each sector, though, relative risk controls are also in evidence in the form of benchmark weightings. It would be unthinkable, for example, for a fund to have no oil holdings, since the sector comprises about 5% of the market. And even at the individual stock level, it would be exceptional if a fund did not hold both BP and Shell, since their weighted contribution to the index implies significant risk that the fund may fail to achieve its benchmark.

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[14] See Walmsley, Yadav and Rees (1992) for market-based evidence of the value-relevance of these meetings.

[15] These views are consistent with semi-strong form market efficiency (Fama, 1970), because they imply that analysts are concerned about disclosure but not about presentation.

Regarding the information on which decisions are based, fund managers were asked to rate each of the categories in Table 5 on a five-point scale from 'vitally important' to 'not at all important'. These results may be compared with those of analysts (Table 2).

Four observations can be made from Table 5. The first is that formal meetings with senior company management are the dominant source of information. They are unique in having a median and a modal rating of 'vital importance'. Their mean rank of 2.96 is also strikingly lower than that of the annual report and accounts (mean rank of 5.26), and it is differentiated by the Wilcoxon test at an approximately zero per cent level of significance. The second observation is that the report and accounts (especially the annual, though also the interim) is clearly the second-ranked source of information. This contrasts with the finding for analysts, but it is clearly evidenced by each of the measures in Table 5. Third, 'raw' data from companies is more important to fund managers than 'processed' data from analysts. Company and sector research by analysts ranks fourth in Table 5, and its importance cannot be differentiated statistically from that of the results announcement. Economic and strategic research is of hardly any importance. These results suggest that the market for financial reporting is more important to fund managers than the market for financial analysis, in spite of the latter being a specialised and costly service. Finally, a fourth observation is that the AGM is of no practical importance to fund managers (or, indeed, to analysts) as a source of information. If the purpose of the AGM is shareholder communications, then it is almost entirely ineffective.

The importance to fund managers of the market for financial reporting is examined further in Table 6, which presents evidence on company-specific information.

In common with analysts, the highest-ranked information source in Table 6 is direct, personal contact with company management. While analysts will have fairly frequent, *ad hoc* contact with a company, however, the fund managers explained that their meetings with senior company management are a formalised process. A large fund management firm will be visited by a few hundred companies each year, with larger companies generally visiting twice. The firm will be a shareholder in a number of these but by no means in all. In addition to these 'routine' meetings, companies may also visit at times of takeovers, significant management changes or similarly important events. A typical company might be represented by the chief executive and the finance director, who would spend between one and one and a half hours with a small number of fund managers. The meeting is likely to include a formal presentation

Table 5
Fund managers - sources of information

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median value (1-5)	Modal value (1-5)
Formal meetings with senior company management	0.00	2.96	1	1
Annual report and accounts	0.00	5.26	2	2
Interim report and accounts	0.61	7.08	2	2
Analysts (company/sector)	0.97	7.92	3	3
Results announcement	0.35	8.10	3	3
Other direct contact with the company	0.95	8.63	3	3
Market news - ICV/Reuters	0.69	8.95	3	3
Investors' results meetings	0.93	9.64	3	3
Newspapers	0.42	9.65	3	3
Industry contacts	0.58	9.86	3	3
Industry information services	0.85	10,29	3	3
Analysts (strategy/economics)	0.00	10.67	3	3
AGM	0.81	13.83	4	5
Companies House	—	13.96	5	5

Kendall's coefficient of concordance: W = 0.48; Significance = 0.000.

Table 6
Fund managers - sources of information direct from the company

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median rank	Modal rank	Analysts' ranking
Personal contact - by phone, writing or individual visit	0.00	1.37	1	1	1
Report and accounts	0.06	2.42	3	3	3
Results announcements & investors' meetings	0.13	2.88	3	4	2
Organised site visits and other presentations for groups of investors	—	3.32	4	4	4

Kendall's coefficient of concordance: W=0.42; Significance=0.000.

by the company, but it will always be centred around a series of questions from the fund managers.[16]

Each fund manager was asked an open-ended question concerning the importance of these meetings. Their responses, though varying in detail, were highly consistent in identifying two reasons why the meetings are considered to be so important. First, they allow fund managers to understand the strategy of the company, thereby testing their understanding of broad valuation parameters and of the share price's major sensitivities. Fund managers believe that this is best done by meeting the senior management, who determine the strategy and are responsible for it, and who should therefore be in the best position to (efficiently) expound it.

Second, they allow fund managers to assess the management's capacity to achieve the strategy. This assessment will use accounting information in considering the resources of the business and its performance track record. Importantly, the fund manager will also make a personal assessment of the ability, reliability and motivations of senior management, including whether they have shareholder interests at heart (for example in the decision to reinvest or to return free cash flows).

Meetings with company management are best seen as a dynamic process—a strategic interaction—with each meeting following on from those that have gone before. Fund managers will prepare their questions by using the notes from previous meetings, together with (typically) a couple of recent analysts' reports and the annual report and accounts. The ongoing review of the firm's investment in the company is central, and company management are held accountable for 'promises' made in previous meetings.

It is in this dynamic context that the report and accounts is ranked more highly for fund managers than for analysts. While analysts act upon news, which is rarely contained within the report and accounts, fund managers rely upon trends over time, for which the accounts serve as a valuable point of reference. Moreover, the fund manager is constrained by the transactions costs and liquidity of shareholdings. It is not possible for the fund manager to act upon news in a way that the analyst can, and a longer-term perspective is enforced that reduces the importance of results announcements. An implication is that, while the report and accounts is not useful in the sense that there is a short-term market reaction to its information content, it *is* useful as a comprehensive source of accounting information over time. This point is made notwithstanding the fact that the fund managers (in common with the analysts) perceived that companies differ in the quality of accounting information that they provide and, further, that this differentiation is primarily a matter of the level of disclosure.

The final source of information in Table 6, site visits, is of lowest importance for two reasons. First, they are time-consuming for fund managers, whose resources are thinly spread across a range of companies. Second, in contrast to high-level meetings, site visits typically concern a narrow segment of the company rather than an overview of the whole.

Moving on to the information that fund managers receive from analysts in the market for financial analysis, each of the categories in Table 7 was ranked from 1 to 8 in order of importance. The converse series of responses from the analysts is given alongside (and is based upon the mean rank in Table 1).

The four most highly-ranked categories in Table 7 each require the analyst to process public domain information. They also reflect the fact that

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[16] Note that the fund managers' description of these meetings is consistent with that of the finance directors.

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Table 7
Fund managers - service from analysts

	Significance of differences between adjacent ranks: Wilcoxon Test probability	Mean rank	Median rank	Modal rank	Analysts' ranking
Informed analysis of specific companies	0.08	2.22	2	2	1
'Value added' ideas and analysis	0.60	2.76	3	3	2
Informed analysis of the industry	0.00	2.96	2.5	2	4
Informed views on events	0.01	4.24	4	5	6
Accurate earnings forecasts	0.65	5.46	6	5	5
'Database' service	0.26	5.62	6	6	8
Profitable recommendations	0.17	6.06	7	7	3
Frequent market update	—	6.68	7	8	7

Kendall's coefficient of concordance: W = 0.48; Significance = 0.000

the fund managers value analysts who are 'advisers' over those who are 'recommenders' (see above). This is evident in the statistical discontinuity in rankings between the top four categories and accurate earnings forecasts, and it is also especially evident in the very significant difference between fund managers and analysts in the importance attributed to profitable recommendations. This suggests that fund managers perceive themselves to have both analytical skills and decision-making autonomy—a perception that is also reflected in the higher rankings given by fund managers to the simple database service.

Fund managers were asked what characterises 'high quality' in an analyst's report. Their responses were somewhat nebulous ('originality', 'clarity of thought' etc.) but they made it clear that certain types of report are more useful than others. What may be termed 'maintenance research,' which is usually driven by the reporting cycle and is little more than a results restatement, was not regarded as very useful. This is because it reflects the news orientation of the analysts rather than the fund managers' focus on longer-term fundamental variables. At the other extreme, fund managers typically do not have the time to read excessively long, in-depth reports. What they do find helpful, though, is concise, clear and original analysis of companies, which tests the sensitivity of the company's valuation to a range of well-understood scenarios. Such analysis provides a valuable input to discussions with company management, and (critically) it is also a testing ground against internal views on the company.

Fund managers were also asked to assess the quality of analysts' research. The consensus response was that the 'typical' analyst is no better than reasonable, but that the ability and output of the leading analysts in any given sector is very good. Not one fund manager considered the leading analysts to be less than good. This is important because any given fund manager will typically have regular contact with only two or three analysts in a given sector. The implication is that whilst there may be a general over-supply of analysts, their practical analytical contribution to the market is highly-rated. This is consistent with the views of the finance directors.

The results presented in this section present a conundrum. Fund managers appear to find informed analysis more important than raw data, and they rate highly the analysts with whom they have regular contact. However, they also believe that direct contact with companies (who themselves supply the raw data) is *more* useful than the input of the analysts. A solution to the conundrum, which emerged from the interviews, is that the strengths of analysts' research are offset by four significant weaknesses. The first of these is that analysts were perceived to have short-term objectives that are in conflict with those of the fund managers. This is because research is ultimately funded on a commission basis, with analysts' income (and fund managers' costs) being a function of trading activity rather than of security returns.

Second, analysts were perceived to be 'too close' to the companies that they follow. The perception is that analysts are fearful of upsetting companies and thereby losing their privileged access to information (and possibly their broker status), and also that they rely too heavily on the nudges and prompts of management.

Third, the fund managers preferred to assess company management personally and directly, rather than through the analysts. Finally, the information that the analysts provide is available to all of their clients, and it was perceived to be in the public domain. It therefore has limited potential to offer fund managers a competitive advantage over their rivals.

In summary, fund managers' economic incentives are focused on returns relative to a benchmark, and they are especially concerned to minimise the risk of underperformance. Their holdings are illiquid and their time horizon is therefore longer than that of the analysts. Their primary information source is formal meetings with senior company management, and these dominate the importance of the market for financial analysis in spite of the quality of analysts' company-specific advice.

9. Conclusions

The independent research findings for finance directors, analysts and fund managers can now be drawn together and analysed in the context of the market for information as a whole. The findings for economic incentives and information flows are first summarised. A grounded theory of the market for information is then derived and used as a basis for drawing implications for accounting research.

With regard to economic incentives, a striking congruence was found between FDs and fund managers in that both are focused over a similar time horizon on a benchmark of relative share price performance, and both take great care to avoid negative surprises. In sharp contrast, however, analysts favour share price volatility rather than stability. This can be attributed to their economic incentive to maximise turnover-based commission income.

With regard to information flows, there was a general perception across FDs, analysts and fund managers that there are no serious constraints on the availability of information (although both analysts and fund managers consider that this varies across companies). Moreover, the evidence from both FDs and analysts suggests that the market response to new information (such as the results announcement) is very rapid, and thereby consistent with the EMH. FDs, analysts and fund managers were also in agreement that the company itself is centrally important as a source of information. For analysts, direct contact with the company provides timely, focused, forward-looking information that is perceived to offer a competitive advantage over rival analysts. For fund managers, formal meetings offer an opportunity to assess the company's strategy and the ability of management, in the light of information from previous meetings as well as the performance record in the report and accounts.

The meetings are also perceived to offer a competitive advantage in terms of investment performance relative to rival funds. They are more important than analysts as an information source, in spite of the high regard that both FDs and fund managers have for the leading analysts. The information service of the analysts is more useful to fund managers when it consists of informed advice such as sensitivity tests of market valuations, rather than specific recommendations, earnings forecasts or simple channels of public domain information. The fund managers perceive, however, that the analysts' economic incentives conflict with their own, that the analysts' reliance on companies for information generates both bias and duplication, and that the supply of information to the public domain reduces its usefulness in outperforming benchmarks.

These findings concerning economic incentives and information flows give rise to a grounded theory of the market for information. This theory has two components. The first is that the market for financial reporting is of considerably greater importance than the market for financial analysis. This is due primarily to the common interest of FDs and fund managers in a stable, well-informed market. This common interest leads to a strategic informational relationship whereby FDs voluntarily supply fund managers with information to monitor their (illiquid) investments.

The second component of the grounded theory seeks to explain, in the light of the secondary importance of the market for financial analysis, the role of analysts in the market for information. The hypothesis is that analysts are both a 'news agency' and a 'source of valuation benchmarks'. The first of these roles arises from the evidence that analysts respond quickly to news, that they regard company contact as an opportunity to introduce value-relevant news to the market and that they 'sell' as quickly and as widely as possible their interpretation of news. In short, the analysts are mechanisms of stock market information efficiency, and they serve to continually update the fund managers' evaluation of both their existing portfolio and of prospective investments.

The second role for analysts is linked to their own (and fund managers') perception that they are not just conduits of public domain information, but that they also conduct informed analysis that 'filters' a broad information set and then makes public anything of value-relevance. This publication of valuation parameters provides a benchmark against which fund managers can test their own private information, which is essential for both relative risk minimisation and for the assessment of prospects for outperformance. In other words, while fund managers may not be able to outperform by using analysts' output directly, they nevertheless still need the analysts in order to have a measure of the consensus beliefs of the market.

Both components of this grounded theory have implications for accounting research, as follows.

First, the primacy of the market for financial reporting has been given insufficient attention in the research literature. This paper has shown that the congruent economic incentives of FDs and fund managers support a system of effective communication behind closed doors. Fund managers' 'private' meetings with senior company management effectively circumvent the public-good problem of information, and they are of *central* importance to share price determination. These meetings also ensure that fund managers are not just passive recipients of information, but that there is a feedback and control loop whereby investee companies are held accountable for their performance in successive periods. Accounting research has not recognised the importance of these meetings, however, and we know remarkably little of the role that accounting information plays in this communication (and valuation) process.

The research implication of the second component of the grounded theory arises because the role of the analyst has been somewhat misunderstood. The methodology of events studies, for example, parallels the analysts' focus on the news element of the results announcement and the associated *change* in the share price. In contrast, fund managers are less 'news-sensitive', and they use the report and accounts on a year-on-year basis as a confirmation of performance and a basis for extrapolation. Accounting information therefore remains relevant to decision-making in spite of the fact that it may already be reflected in share prices (Lev and Ohlson, 1982). More generally, the research literature has tended to make the rather simplistic *assumption* that analysts act as the market's equilibrium mechanism. This assumption has caused market-based research (in particular) to give undue prominence to analysts' earnings forecasts and trading recommendations. An implication of this is that the literature has failed to capture the (secondary) role that analysts actually play in the determination of share prices.

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Appendix: Sample selection and fieldwork

The sample of finance directors was determined on the basis of stock market sectors and capitalisations, and comprised the largest and the smallest FT-SE 100 stocks in each sector (with some adjustments made to this rule where, for example, an important sector comprised a large number of stocks which were individually too small for inclusion in the FT-SE 100). The resulting 63 FDs were contacted by letter and asked to participate in a one-hour interview. There were 40 positive replies (response rate 63%), and all were included in the final sample (Table A1). There was no discernible response bias according to either market capitalisation or industry grouping. The final sample represented more than 50% of the value of the FT-SE 100.

Interviews with finance directors were conducted during the months of June to August, 1995. In preparation for each interview, four data sources were studied. These were: the most recent annual report and accounts; a complete set of all company-specific reports produced in the previous 12 months by a leading firm of stockbrokers; all of the *FT*'s Lex column articles relating to the company in the previous 12 months; and (where applicable) all submissions that the companies had made to the ASB in response to discussion papers and exposure drafts. Taken together, these data sources facilitated the interviews by allowing informed company-specific questions to be asked within the pre-determined framework of set questions. They also allowed some degree of objective check on interviewees' responses and they helped ensure that potentially important issues were not bypassed.

In selecting a sample of analysts, the Extel survey (Extel, 1994)[1] was used to identify the firms

Table A1
Finance directors - sample description

Groups of market sectors	Market capitalisation - (Group % of total FT-SA-All Share)	No. of companies approached	No. of companies in final sample	Response rate (%)
Mineral extraction	9	5	4	80
Industrials	19	15	8	53
Consumers	19	12	8	67
Services	19	14	8	57
Utilities	14	8	5	63
Financials	20	9	7	78
Total	100	63	40	63

Table A2
Analysts - sample description

Firm Sector	A	B	C	Questionnaire total	A	B	D	E	F	G	Interview total
Mineral extraction	1	0	0	1	0	0	0	0	0	1	1
Industrials	6	4	1	11	2	3	2	1	0	1	9
Consumers	4	1	1	6	2	0	1	1	0	1	5
Services	6	4	1	11	1	0	1	1	2	0	5
Utilities	2	1	1	4	0	1	1	1	0	0	3
Financials	3	3	0	6	0	2	1	1	2	2	8
Other	1	1	1	3	0	0	0	0	1	0	1
Total	23	14	5	42	5	6	6	5	5	5	32

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[1] Extel is a *Financial Times* service, and the survey is an annual assessment of analysts by fund managers in the UK.

Table A3
Fund managers - sample description

Client type	Approximate total value of UK equities managed by the sample firms	Approximate total value of UK equities managed by UK-based institutional investors[4]	Sample percentage of total
Pension funds	75.3	284.8	26
Life assurance	43.0	215.7	20
Unit or investment trusts	20.6	96.2	21
Other	3.7	n/a	—
Total	142.6	596.7	24%

[4] Data is for year-end 1995. The estimates for pension funds and life assurance are taken from *Financial Statistics* (ONS, 1996). The estimates for unit and investment trusts are based upon industry data (PDFM, 1996). The 'other' category is a residual from survey responses, and it is not defined at an aggregate level.

that are of greatest importance in the determination of share prices. The Extel survey indicates very clearly that there is a very small number of firms of analysts that are dominant. More specifically, nine firms accounted for 87% of the total weighted votes in 1994 (88% in 1993). In view of the market dominance of these firms, there was considered to be little benefit in contacting any analysts from elsewhere. In the first instance, one of the nine firms was approached with a request to conduct participant observation. The request was successful, and one month was spent with the firm in July–August, 1994. This involved working the same hours as the analysts in the same environment. It also included unrestricted time spent with analysts, both within the firm and at corporate results announcements and analysts' meetings.

Subsequent to this first-hand experience, a letter was written to the Head of Research at each of the nine firms, requesting the participation of UK analysts in questionnaire and interview research. Seven of the nine firms agreed to take part in the research, though the level of participation varied considerably. Survey responses were received from 42 analysts, while 32 analysts participated in a one-hour interview. The distribution of responses is shown in Table A2, which denotes each of the participating firms by the letters A to G. Firms A, B and C each participated in the questionnaire, while A, B, D, E, F and G took part in the interviews. Firm A was the host for the participant observation.

It is evident from Table A2 that the sample of interviewees is somewhat overweight in financials and underweight in services in proportion to the sample of questionnaire respondents. There are no substantial differences between the two samples, however, and there is also a fairly even distribution across sectors within each of the individual firms.

The analysis of this paper covers both the questionnaire and the interview research. There were only four analysts who participated in both, and the two samples are therefore mostly additive. A sample size of 42, 32 or 70 relates to questionnaires, interviews or to the combined sample, respectively. All analysts were company/sector specialists; none were strategists or economists.

Consistent with the analysis of finance directors and analysts, the sample selection for fund managers focused on the largest firms, which collectively play a dominant role in the market. The most obvious criterion for ranking the size of firms is the value of funds under direct management. A sample of 40 firms was selected for this study, which included all UK-based firms with approximately £10bn or more of total funds under management.[2] A letter was written to the Heads of Investment in each of these firms. The letter requested the participation of UK equity analysts/fund managers in a one-hour interview. Sixteen firms agreed to participate in the research, and the total value of their funds under management is given in Table A3.

The final column of Table A3 shows that the sample of firms represent approximately 24% of total UK-based institutional investment in UK equities. Moreover, the value of UK equities managed by these firms on behalf of each client type is approximately representative of the value-weighted proportion of client types in the market as a whole.[3]

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[2] Following advice from the Institutional Fund Managers' Association, survey-based estimates of funds under management for individual firms were taken from *Institutional Investor* (November, 1994), the *Financial Times* (27 April, 1995) and *Euromoney* (August, 1995).

[3] The number of participants from each firm was not pro-

In total, 39 individual fund managers participated in the research, which took place between December 1995 and May 1996. Some of these participants are best described as portfolio managers and others as in-house ('buy-side') analysts, although the distinction between these two groups is blurred in practice and a dichotomisation is therefore not possible. Both groups are referred to collectively here as 'fund managers'.

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portional to the value of funds managed by the firm, though correcting for this did not distort the representative quality of the sample that is evidenced in Table A3.

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The public disclosure of environmental performance information—a dual test of media agenda setting theory and legitimacy theory

Noel Brown and Craig Deegan*

Abstract—This paper documents the results of an empirical study undertaken within Australia of the relationship between the print media coverage given to various industries' environmental effects, and the levels of annual report environmental disclosures made by a sample of firms within those industries. The paper draws upon previous studies in media agenda setting theory and legitimacy theory to develop two testable hypotheses. Nine industries are reviewed across the period from 1981-1994. Drawing upon two theories, it is argued that the media can be particularly effective in driving the community's concern about the environmental performance of particular organisations (from media agenda setting theory). Where such concern is raised, organisations will respond by increasing the extent of disclosure of environmental information within the annual report (from legitimacy theory). The results indicate that for the majority of the industries studied, higher levels of media attention (as determined by a review of a number of print media newspapers and journals) are significantly associated with higher levels of annual report environmental disclosures.

1. Introduction

Within Australia, as in the UK, US and many other countries, there has been an increasing propensity for companies to publicly disclose information about their environmental performance (for Australian evidence see Guthrie and Parker, 1989; Gibson & Guthrie, 1995; Deegan and Gordon, 1996; Deegan and Rankin, 1996). Such information has predominantly been disclosed within the organisations' annual reports; however there is a new trend in many countries for organisations to provide environmental performance information within a stand-alone environmental report.[1] Nevertheless, the annual report remains the main vehicle for Australian corporate environmental performance disclosures and, as such, is the focus of study in this paper.

The purpose of this paper is to provide the results of a study which investigates the relationship between the print media's attention to an industry's environmental performance, and the annual report environmental disclosures made by firms within that industry. Specifically, this study considers whether corporate management react to changes in the extent of media attention given to their industry's environmental impact, with the reaction taking the form of corresponding changes in the level of corporate environmental disclosures made within the annual report. Given that the professional accounting bodies in various countries are dedicating both effort and financial resources toward the development of environmental disclosure guidelines, it is essential that such bodies understand what motivations/factors drive organisations to publicly report environmental information.[2] This paper seeks to contribute to this knowledge.

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[1] Recently, stand-alone environmental reports have been released in Australia by WMC Resources Ltd, BHP Ltd, North Ltd, Rio Tinto Ltd, Body Shop Australia, Pacific Power, Mount Isa Mines, Western Power, and ICI Australia. For the majority of these companies, the first report was released in 1997. In late 1996 the Mineral Council of Australia released a code entitled 'The Australian Minerals Industry Code for Environmental Management'. One requirement of the code is that from 1998 signatories are to report on an annual basis about their environmental performance. The reporting is to be done by way of a stand-alone report. This initiative will further increase the usage of stand-alone environmental reports within the Australian minerals and energy industries.

[2] For example, the Institute of Chartered Accountants in Australia established an Environmental Accounting Task

This study draws upon both legitimacy theory and media agenda-setting theory to develop two testable hypotheses. Arguments are advanced to support the notion that the media is able to influence the degree of community concern for issues such as the environment. The relationship between community concern and corporate disclosure strategies is tested across nine Australian industries.

The remainder of this paper is organised as follows. We firstly consider previous environmental reporting research. We also briefly describe two theories that are relied upon within this study, these being legitimacy theory and media agenda-setting theory. Following this, the two hypotheses of the study are provided. An overview of the research methods employed is then provided, followed by a discussion of the results. The final section addresses the implications and potential limitations of the study.

2. Prior research

As indicated in Deegan and Rankin (1996), consistent with many other countries there is a general absence of statutory or professional regulations requiring Australian companies to publicly disclose information about the environmental implications or impacts of their operations.[3] Nevertheless, evidence shows (for example, Guthrie and Parker, 1989; Gibson and Guthrie, 1995; Deegan and Gordon, 1996; Deegan and Rankin, 1996) that Australian companies are providing environmental information within their annual reports and that the extent of disclosure is increasing across time. Gray, Owen and Adams (1996) provide evidence that such an observation can also be made within the UK, US, and many other countries. Many of the papers that have reviewed corporate environmental disclosure practices have adopted a legitimacy theory perspective. This perspective, which is also adopted within this paper, is briefly discussed below together with a summary of some corporate social responsibility disclosure research which has adopted this perspective.[4]

3. Legitimacy theory

Legitimacy theory posits that organisations continually seek to ensure that they operate within the bounds and norms of their respective societies. These bounds and norms are not fixed, but change across time, thereby requiring the organisation to be responsive. In a sense, there is a 'social contract' between the organisation and those affected by the organisation's operations. The organisation is expected to comply with the terms of this 'contract', and these expressed or implied terms are not static. As Shocker and Sethi (1974: 67) state:

> 'In a dynamic society, neither the sources of institutional power nor the needs for its services are permanent. Therefore, an institution must constantly meet the twin tests of legitimacy and relevance by demonstrating that society requires its services and that the groups benefiting from its rewards have society's approval.'

As indicated in Deegan and Rankin (1996: 54), if an organisation cannot justify its continued operation, then in a sense the community may revoke its 'contract' to continue its operations. This may occur through consumers reducing or eliminating the demand for the products of the business, factor suppliers eliminating the supply of labour and financial capital to the business, or constituents lobbying government for increased taxes, fines or laws to prohibit those actions which do not conform with the expectations of the community.

The view embodied within legitimacy theory, that organisations will be penalised if they do not operate in a manner consistent with community expectations, is a view that is publicly being embraced by corporate management. This is reflected in some statements made by North Ltd in its first stand-alone Environment, Safety and Health Report issued late in 1997 (North Ltd is a large Australian diversified resource company with assets in excess of $A4bn). In the report the directors of North Ltd state:

> 'We recognise that the support we receive for our activities will depend largely on our ability to protect the health and well-being of the people and the environment around our operations.... The communities in which we op-

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Force in early 1995. One of its missions is to formulate environmental reporting guidelines for its members. Another mission is to raise the awareness of its members about the relevance of the environment to the various accounting-related duties they perform.

[3] There are some general reporting requirements which have applicability to the environment. For example, Australian companies are required to provide *true and fair* balance sheets and profit and loss accounts, and to disclose information about material contingent liabilities and material after balance date events. Such requirements could relate to particular environmental issues associated with a company's operations. The only specific corporate reporting requirement of an environmental nature is that Australian companies involved in the extractive industries must disclose their provisions for restoration, and details of the accounting methods used to generate the restoration provisions. This requirement is embodied within the Urgent Issues Group Abstract 4: 'Disclosure of Accounting Policies for Restoration Obligations in the Extractive Industries', which became effective in August 1995.

[4] Social responsibility disclosures can include, amongst other things, disclosures of information about the interaction of an organisation with its physical and social environment, inclusive of community involvement, the natural environment, human resources, energy and product safety (Mathews, 1993).

> erate have a right to understand the impact of our activities and a legitimate expectation that we will act responsibly to protect the quality of the environment. Similarly our workers and their families, who are part of those communities, have a right to be reassured that we are doing all we can to protect their safety and health.... Performance in these areas is of critical importance to our employees and the community and is therefore essential to the future success of our Company.'

Drawing upon another statement from a senior Australian corporate executive, John Prescott, managing director and chief executive officer of BHP Ltd, one of Australia's largest corporations, made the following statement at the front of his organisation's inaugural Environmental Report (the report was released in late 1997. John Prescott resigned from BHP Ltd in March, 1998):

> 'We live in a time of great change: new environmental regulations, changing community expectations, and emerging scientific knowledge about the impacts of human activities. We will embrace these developments as part of our vision to be the world's best resources company.'

Consistent with legitimacy theory, Prescott's statement reflects the view that organisations must adapt to community expectations if they are to be successful. This view is also reflected in WMC Ltd's 1997 annual report (WMC Ltd is also one of Australia's largest corporations). In the report the directors state:

> 'WMC's environmental performance affects the Company's ability to attract skilled people, capital and community support. Good environmental management reduces costs, meets the expectations of the communities in which WMC operates, and enables the company to be more profitable.'

The directors of WMC Ltd also make the following statement in their second stand-alone environmental performance report, issued in 1997:

> 'WMC understands that its access to land and its public licence to operate depend to a considerable extent on informing and involving the communities in which it operates. The Company recognises the need for local communities to be more involved in decision making. Over time, community expectations change. WMC is looking to develop policies and processes to foster community consultation at all its operations.'

The above quote uses the term 'public licence to operate'. This term is what many authors might refer to as a 'social contract'. We could give further examples of statements made by corporate personnel that are similar to the above, however this would be somewhat superfluous. What the statements illustrate is that the notions embodied within legitimacy theory, and incorporated within this study, are reflective of the public positions being taken by Australian corporate executives. Management does appear to consider the expectations of the community in which it operates and realises that failure to do so will be detrimental to the ongoing operations of its entity.

Given the potential costs associated with conducting operations that are deemed to be outside the terms of the 'social contract', Dowling and Pfeffer (1975) state that organisations will take various actions to ensure their legitimacy. According to Dowling and Pfeffer, organisational legitimacy is essentially the outcome of:

> '[O]n the one hand, the process of legitimation enacted by the focal organisation, and on the other, the actions affecting relevant norms and values taken by other groups and organisation' (p. 125).

Legitimacy itself can be considered to be a condition or status. Legitimation, on the other hand, is a process which organisations can undertake (perhaps through particular disclosure strategies) to take them to this state. Lindblom (1994), as quoted by Gray, Kouhy and Lavers (1995), states:

> '[L]egitimacy is a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a part. When a disparity, actual or potential, exists between the two value systems, there is a threat to the entity's legitimacy.' (p. 54)

Lindblom describes four strategies that an organisation can adopt whenever it proceeds with the process of legitimation. These strategies are:

- the organisation may seek to educate and inform its relevant publics about actual changes in the organisation's performance and activities;[5]
- the organisation may seek to change the perceptions of the relevant publics without having to change its actual behaviour;
- the organisation may seek to manipulate perception by deflecting attention from the issue of concern to other related issues through an appeal to, for example, emotive symbols; and/or
- the organisation may seek to change external expectations of its performance.

The process of legitimation can be related to the accounting process. Hurst (1970) suggests that one of the functions of accounting, and subsequently accounting reports, is to legitimate the existence of the corporation. 'The legitimacy' of the organisation is threatened whenever the "relevant publics"' expectations of the performance of the organisation are in conflict with the actual performance of the organisation. This is referred to as a 'legitimacy gap'.

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[5] 'Relevant publics' can be considered to be those parties that are affected by, or have a stake in, the operations of the organisation.

A number of papers, some described briefly below, have identified specific types of social responsibility disclosures that have appeared within annual reports and which have been explained by the respective researchers as being part of the portfolio of strategies undertaken by accountants and their managers to bring legitimacy to, or maintain the legitimacy of, their respective organisations.

One study which sought to link legitimacy theory to corporate social disclosure policies was conducted by Hogner (1982). Hogner's longitudinal study examined corporate social reporting in the annual reports of US Steel Corporation over a period of 80 years, commencing in 1901, the data being analysed for year to year variation. Hogner argued that social disclosures represented a response to society's expectations of corporate behaviour. In the study, variations in social disclosures were linked to variations in community social performance expectations.

Guthrie and Parker (1989) conducted a longitudinal study, similar to Hogner's, of Australia's largest corporation, Broken Hill Proprietary Company Limited (BHP). The study reviewed the social information published in BHP's annual reports over a period of one hundred years commencing in 1885. They compared the timing of observed peaks of corporate social disclosure with major events in the history of BHP. Apart from social disclosures relating to the environment, other forms of social disclosure could not be explained by legitimacy theory. However, the authors note that the failure may have been due to limitations in their data sources which could, for example, have excluded a number of significant events, rather than a failure of the theory itself.

An event study incorporating legitimacy theory was conducted by Patten (1992). Patten focussed upon the change in the extent of environmental disclosures made by North American oil companies, other than Exxon Oil Company, both before and after the Exxon Valdez incident in Alaska in 1989. He argued that if the Alaskan oil spill resulted in a threat to legitimacy of the petroleum industry, and not just to Exxon, then legitimacy theory would suggest that companies operating within that industry would respond by increasing the amount of environmental disclosures in their annual reports. Patten's results indicate that there were increased environmental disclosures by the petroleum companies for the post-1989 period, consistent with a legitimation perspective. This disclosure reaction took place across the industry, even though the incident itself was primarily related to one oil company.

Deegan and Gordon (1996) reviewed annual report corporate environmental disclosures made by Australian companies across the years from 1980 to 1991. They investigated the objectivity of corporate environmental disclosure practices and trends in environmental disclosures across time. They also sought to determine if environmental disclosures are related to concerns held by environmental groups about particular industries' environmental performance. The results derived by their study confirm, among other findings, that: (1) increases in corporate environmental disclosures across time are positively associated with increases in the levels of environmental group membership; (2) Australian corporate environmental disclosures are overwhelmingly self-laudatory; and (3) there is a positive correlation between the environmental sensitivity of the industry to which the corporation belongs and the level of corporate environmental disclosure.[6] Deegan and Gordon argue that the levels of corporate environmental disclosures are associated with the legitimation process, whereby companies seek to attain the status of legitimacy.

Deegan and Rankin (1996) utilised legitimacy theory in an attempt to explain systematic changes in corporate annual report environmental disclosure policies around the time of proven environmental prosecutions. The results of their study indicate that Australian companies provide a significant increase in favourable environmental information surrounding environmental prosecution. They also found that in the years of prosecution those companies that had been prosecuted provided significantly more positive environmental disclosures than a matched sample of non-prosecuted companies (matched by size and industry). They argue that this is consistent with a legitimation motive by the sample corporations. The results of their study are consistent with the third strategy described by Lindblom (as discussed earlier in this paper) in which organisations voluntarily disclose particular 'favourable' information in an effort to deflect attention away from other potentially damaging news.

Hence, evidence exists that corporate management does understand that it must operate within the bounds and expectations of society (as reflected by the various corporate executive statements provided earlier in this paper) and that it will react to perceived changes in community perceptions about its operations, with such reaction frequently taking the form of variations in the social disclosures made within the organisations' annual report. As we will indicate below, there is evidence to suggest that the media can influence community perceptions. The following section briefly discusses some literature which addresses how the media can act to shape public perception.

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[6] Environmental sensitivity was determined by use of a questionnaire administered to Australian environmental lobby groups, in which office bearers were required to rate industries (on a 0 to 5 scale) on the basis of whether the industry had been made the focus of action as a result of its environmental performance/implications.

4. Media agenda setting theory

Media agenda setting theory posits a relationship between the relative emphasis given by the media to various topics and the degree of salience these topics have for the general public (Ader 1995: 300). In terms of causality, increased media attention is believed to lead to increased community concern for a particular issue. The media are not seen as mirroring public priorities; rather, they are seen as shaping them.

In a study of the agenda setting influence of the US press in the 1968 US presidential campaign, McCombs and Shaw (1972) provide evidence, consistent with the earlier findings of Berelson (1942), that there is a significant relationship between the emphasis placed on different campaign issues by the media, and the judgment of 'undecided' voters as to the salience and importance of various campaign topics. McCombs and Shaw (p. 176) argue that 'in choosing and displaying news, editors, news room staff, and broadcasters play an important role in shaping political reality'.[7]

Considering the nature of the issues being addressed by the media, research conducted by Zucker (1978), within the framework of media agenda setting theory, found that the less direct experience people have with an issue, the more likely they would be to rely on the media for information and interpretation of that issue. According to Zucker (p. 239), 'people today live in two worlds; a real world and a media world. The first is bounded by the limits of direct experience of the individual and his acquaintances. The second spans the world bounded only by the decisions of news reporters and editors'.

Zucker categorised issues according to their 'proximity' to people. Issues in which people had personal experience were termed 'obtrusive', whilst those issues in which people had very little direct personal contact were termed 'unobtrusive'. It was found that the public placed a greater reliance upon the media for information concerning unobtrusive issues. According to Zucker, the environment is an unobtrusive issue. He found that agenda setting did not occur for a number of obtrusive issues because individuals are able to rely on real-world conditions and interpersonal discussion for information, while in the case of the unobtrusive issues (which includes the environment), individuals rely on the information that they obtain through the media. Eyal, Winter, and DeGeorge (1981) also provide evidence that the environment is an unobtrusive issue which demonstrates a strong media-setting effect. The notion that the media has more influence in relation to unobtrusive issues, relative to obtrusive issues, is also supported by Blood (1981).

There are various sources of media influence. Mayer (1980) indicates that newspapers have the capability of influencing or determining the way most people think about the world, what they consider to be normal or proper, and what they consider to be important public issues. Further research by McCombs (1981) provides evidence in support of the view that people forget much and misinterpret most of what they see or hear on television news, and that newspapers are better at agenda setting. This view is also supported by research reported by Eyal (1979).

In a more recent study, Ader (1995) investigated the relationship between the media's coverage of pollution-related issues (deemed to be unobtrusive issues) and the public's concern with pollution issues. One hypothesis which was tested was that the media agenda (measured by content analysis undertaken by the *New York Times*) and the public agenda (Gallop Poll survey data was used to determine the public agenda) for the issue of pollution will be positively related, with a change in the attention given to the issue by the media leading to a change in the public agenda.

A further hypothesis that was tested was that the relationship between the public agenda and real world conditions for the issue of pollution will be unrelated.[8] Her results supported the hypotheses. According to Ader (p. 310) the extent of media attention given to pollution issues did positively affect the community concern for such issues. She considered that such a result confirms previous research findings that the environment is an unobtrusive issue; an issue that does not have direct tangible consequences for individuals. She concluded that because the public has little personal contact with pollution, they place a greater degree of reliance on the media for pollution-related information.[9] Ader's findings also indicated that 'real-world conditions' do not influence the media or public agendas directly. She found that 'correlations between the Gallop poll respondents naming environmental problems as the most important problems in America with real-world indicators of pollution were found to be statistically not significant for all three sub-issues of pollution and the total pollution index' (p. 309).

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[7] An extreme, but somewhat interesting view of the media's power of influence is provided by White (1973: 23). In relation to the US he states that 'the power of the press in America is a primordial one. It sets the agenda of public discussion; and this sweeping political power is unrestrained by any law. It determines what people will talk and think about—an authority that in other nations is reserved for tyrants, priests, parties and mandarins'.

[8] 'Real-world' conditions were derived by reference to data provided in the publications *Environmental Quality*, and *Characterization of Municipal Solid Waste in the United States 1960–2000*. These publications provided the necessary data to develop 'real world pollution indices'. A separate index was constructed for air pollution, water pollution, and for waste. An aggregate total pollution index was also constructed.

5. The hypotheses of this paper

In summary to this point, the previous discussion provided in this paper has argued that:

(a) management use the annual report as a tool to legitimise the ongoing operations of the organisation (from legitimacy theory);

(b) community concerns with the environmental performance of a specific firm in an industry will also impact on the disclosure strategies of firms across that industry (from Patten, 1992);

(c) the media is able to influence community perceptions about unobtrusive issues such as the environment (from media agenda setting theory).

Following from the above, it can be argued that if there is increased community concern about environmental issues, driven by increased media attention, then the increased concern should be matched by increased disclosures (if, consistent with legitimacy theory, disclosure policies are a function of community concern). The first hypothesis of this study, based upon the above argument, is:

> The higher (lower) the level of print media coverage given to an industry's environmental implications, the higher (lower) the level of environmental disclosures made by companies within that industry. (H1)

Hypothesis 1 does not consider whether the media coverage is positive or negative in nature. What has been argued is that if an environmental issue is placed upon the public agenda, through coverage by the media, then organisations will respond to the interest and concern which is expected to be expressed by the relevant publics by providing increased environmental information relating to the issue. Conversely, if the environmental issue is not on the agenda of the relevant publics—that is, the issue does not assume importance in the media—then there is likely to be little interest by organisations in providing disclosures relating to their environmental performance.

This view is consistent with results reported in O'Donovan (1997). O'Donovan interviewed senior executives from three large Australian companies (Amcor Ltd, BHP Ltd, and ICI Australia Ltd). The executives confirmed that, from their perspective, the media does shape community expectations, and that corporate disclosures of environmental performance information is one way to correct 'misperceptions held or presented by the media'. O'Donovan did not empirically review any actual environmental disclosures made by the corporations involved.

In circumstances where media attention is of a negative nature, organisations have an incentive to provide greater disclosure in order that the potential implications are controlled. This is consistent with the findings by Patten (1992) and Deegan and Rankin (1996), as described earlier. Consistent with these previous research findings, management may use the annual report in an attempt to counteract the effects of the negative media coverage which, according to media agenda setting theory, will influence public perceptions relating to the issue. Essentially, this means that management will provide positive (or favourable) environmental information about their company in an attempt to counteract negative environmental media information. Based upon this argument, it is further hypothesised that:

> The higher (lower) the level of negative print media coverage given to an industry's environmental implications, the higher (lower) the level of positive environmental disclosures made by companies within that industry. (H2)

As noted above, the development of these hypotheses relied, in part, on predictions derived from media agenda setting theory in which it is argued that the media agenda sets the public agenda. Such a prediction has been supported in a number of research studies, a number of which have been quoted above. Although Griffin (1994: 384) notes that media agenda setting theory is a very well accepted part of the wider communication theories, he also notes (p. 380) that there are a number of researchers who, although not questioning the association between media attention and community concern, question the causality of the relationship. Such researchers propose that their evidence supports a belief that the public's concern for certain issues (the public agenda) actually drives what the media elects to cover (the media agenda)—that is, media coverage tends to be market driven.

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[9] Relating such a finding to an Australian perspective, consider BHP's experience with Ok Tedi in Papua New Guinea. The Australian public would be less informed and perhaps less concerned about the environmental damage caused by the BHP operations at Ok Tedi if the media did not highlight the issue. BHP has expended considerable resources in an attempt to minimise the negative impacts associated with Ok Tedi. Although conjecture, perhaps this would not have been considered necessary had the media not embraced the issue.

Counter to this view, however, Griffin (1994: 380) reports that the majority of the studies that consider lag effects do find that the prominence of an issue increases in the media prior to measurable increases in public concern for the same issue, with the lag typically being fairly short term in nature (typically less than four months).

For the purposes of our study, we are testing for a relationship between media coverage and environmental disclosure by industry over a number of years. This relationship is predicted to exist because we believe that the reporting practices of organisations respond to community concerns. We accept, consistent with prior studies, that community concern for a particular issue is reflected by the extent of media attention given to the issue. Whether community concern is driven, with a fairly limited time lag, by media attention (as the majority of studies seem to indicate), or whether media attention reflects community concern (this being the minority view that media coverage is market driven) is not crucial to our purposes. We are simply arguing that organisations will provide greater disclosures when media attention is greater on the basis that media attention is a proxy measure for public concern.

The following sections describe the research methods adopted to test the above hypotheses.

6. Research methods employed in this study

The time periods chosen for this study are the years 1981/82, 1984/85, 1987/88, 1990/91, and 1993/94. The reasons for selecting the above years are essentially threefold:

1. The method of selecting print media releases, to indicate 'media attention', for this study is expedited through the use of a CD-Rom index. This index, the Australian business index, ABI Inform (to be further discussed below) provides information about media articles written since 1981. Any search conducted prior to the 1981/82 period requires a manual search of each of the print media sources required for the study. A manual search for such media articles was considered impractical and hence the time period of the study was restricted to the period from 1981.

2. To test the hypotheses of this study we needed to review a number of periods so that we had variation in the dependent variable used in this study (media coverage). Due to the timing of the data collection procedures (from early 1995) the latest year in which we were able to collect data about media coverage and annual report disclosures was 1994. As we know from point 1 above, the earliest period in which accessible media data was available was 1981. Hence our period of study was restricted to the period 1981 to 1994.

3. We decided, on the basis of practicality, that we could only review five years within this period, which we decided to spread evenly through the 1981 to 1994 period. We believe that five years of data evenly spread across 13 years should be adequate to provide variation in the dependent variable of this study.

As it has been proposed that print media articles can impact the extent of public concern, print media articles referring to environmental issues associated with Australian companies or industries are selected for the purposes of this study. Data are collected by industry as, consistent with Patten (1992), the environmental performance of one organisation will conceivably impact perceptions about the environmental implications of other organisations within the same industry.

As indicated above, the method used in selecting print media articles associated with environmental issues involves the use of a CD-Rom index. This index provides easy access to an Australian business database, the Australian Business Index, ABI Inform (ABIX). The index provides a guide to published information from a wide cross section of business, finance and trade resources by indexing approximately 85 newspapers and journals. The objective of obtaining print media sources pertaining to environmental issues is achieved by entering search key-words into the ABIX search screen together with the desired time period over which the search is to be performed. The following search key-words were used in this study: environment, environmental, environmentally, ecology, ecological, conserve, conservation, pollution, polluted, emission, emissions, green, greens, greening, greenpeace, and wilderness. The selection of these search key-words is based upon the theme of this study and pertains to words associated with the environment or used within the name of environmental interest groups.

The ABIX database has been progressively developed over the last decade with the number of newspapers and journals included in the database being increased. This has implications for this study due to the potential inclusion of records from print media sources that were not consistently represented within the database covering the period of the study. Due to this possibility, only those print media sources which appear consistently across the period of the study and which were available for review are included as a media source. The media sources used for the study are: *The Australian*; *The Australian Financial Review*; *The Age*; *The Bulletin*; *Business Review Weekly*; *Courier Mail*; and *The Sydney Morning Herald*.

Where articles related to the environment, they were classified by industry using the Australian Stock Exchange Financial and Profitability Index.

For the purposes of analysis, only media releases relating to the following industries, or companies within these industries were reviewed: Chemicals; Forestry and Forest Products; Gold; Oil and Gas: Other Metals General; Pastoral and Agriculture; Sand Mining; Solid Fuels; and Uranium.

In selecting the industries, those industries which were considered to have significant environmental impacts were chosen. The choice of industry is fairly abitrary. However, the choice should nevertheless allow for variation in both media attention and corporate disclosure—the two key variables being reviewed in this study. The media articles were classified as either favourable, unfavourable, or other. Following Hogner (1982), the content of a print media release is considered to be 'unfavourable' (negative) if it contains information about the activities of the company or industry which indicate that the operations/strategies of the industry/company are detrimental to the natural environment. The content of a print media release is considered to be 'favourable' if it contains information about the activities of the company or industry which indicates that the operations/strategies of the company/industry are beneficial to the natural environment. The content of the print media release is considered to be 'other' if it contains information about the activities of the company or industry which does not indicate whether the operations of the company/industry is either detrimental or beneficial to the natural environment.

During the process of analysing the media content the great majority of articles did not provide both favourable and unfavourable material within the one article. They typically included either favourable or unfavourable information only. There was a general absence of articles that could be classified as 'other'. In the case where more than one industry is identified within a single media article the article is attributed to each industry identified. Each media article is given the same weight (a score of one).

Having identified the industries to be reviewed it was then necessary to identify the particular companies within each industry for the purposes of reviewing the contents of their annual reports. We have restricted our analysis to annual reports, as these are the most readily available data source. We acknowledge that organisations can provide information by other means, such as interviews with the media, local community newsletters and the like. Organisations can also provide interested stakeholders with stand-alone environmental reports. This practice, however, is quite limited within Australia, particularly during the period of this study. Nevertheless, the annual report is arguably one of the main vehicles a large organisation has for promoting various aspects of its performance to a large and diverse cross-section of the community.

Research reported in Deegan and Rankin (1997) shows that various diverse groups, such as shareholders, individuals holding office within organisations that undertake a 'review or oversight function' (including employee groups/unions, consumer groups, environmental lobby groups) and academics do seek environmental performance information from an organisation's annual report. Tilt (1994) shows that officers within environmental groups do, on average, review the information provided in an organisation's annual report as part of the environmental group's process of assessing the organisation's environmental performance. Environmental disclosures within an annual report are also perceived by management to be a useful medium for correcting apparent misperceptions held within the community at large, some of which may have been created by the media (O'Donovan, 1997).

Those companies that are to have their annual report reviewed are required to be included on the Australian Graduate School of Management Annual Report File (AGSM). Selecting companies listed on the AGSM file imposes a limitation on the study, as the company reports held on microfiche and CD-Rom are restricted to approximately the top 500 Australian listed companies, based on market capitalisation. The companies selected for each of the industries are retained for the duration of the study. A listing of the companies and their respective industries is provided in Appendix 1. The companies represent the respective industry leaders and constitute at least 50% of all listed companies within the respective industries.[10] Consistent with studies such as Hogner (1982), Guthrie and Parker (1990), Deegan and Gordon (1996), and Deegan and Rankin (1996), the extent of environmental disclosure is determined by counting the number of words contained within the annual report which address environmental issues. The wordcount associated with environmental disclosures is dissected into 'positive' and 'negative' categories.[11] The definitions applicable to the categories of 'positive' and 'negative' environmental disclosure are similar to the 'good news' and 'bad news' definitions chosen by Hogner (1982), and Deegan and Gordon (1996) and are as follows:

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[10] The database for the media articles has a year end of 30 June. This also coincides with the majority of year ends adopted by the 27 companies reviewed in this study. As there is generally between two and three months between balance date and the date the reports are finalised, the companies have at least two to three months to react to the media coverage (more for media articles appearing earlier in the year). However, a limited number of the companies had a 31 December year end, a 30 September year end, and a May 31 year end (those with a 31 May year end typically report in July/August). For the company (1) with the December year end, the annual report was being released at least eight months after the media coverage. As will be indicated later in this paper, we are not aware of any literature which can explain the duration of any possible lag between the media's attention, and management's decision to provide environmental disclosures (which in itself would be dependent upon their perceptions of the lag between the media coverage, and changes in community perceptions). This represents a limitation of this study, and represents one of the areas in which we believe further research may be useful (addressed in the concluding section of this paper).

- Positive: refers to information about corporate environmental activities which have a positive or beneficial impact upon society.
- Negative: refers to information about corporate environmental activities which have a negative or deleterious impact upon society.[12]

Previous studies (for example, Guthrie and Parker, 1989; Deegan and Gordon, 1996; Deegan and Rankin, 1996) have shown that companies predominantly disclose information of a positive nature. For example, in Deegan and Rankin (1996) the mean amount of positive disclosures for the sample companies amounted to 270 words for the period 1990 to 1993, whilst the mean amount of negative words was only six words. It is noted at this stage that the environmental information contained within the company annual reports reviewed in this study are also overwhelmingly 'positive' in terms of content. Further, there is an absence of environmental information in the company reports that is considered to be neither 'positive' nor 'negative' (that is, 'neutral').

An industry average of the amount of annual report environmental disclosure is derived by summing the number of words for each sample company in the industry for a given year, and dividing the total by the number of sample companies in the industry.[13]

Hence, in summary to this point, two broad sets of information have been collected, these being:

1. Printed media coverage relating to the environment, classified by industry by year and whether the article is either favourable, unfavourable, or other; and
2. Company environmental disclosure within annual reports, with the environmental disclosure being measured by words and classified by industry into positive or negative disclosures.

The following section discusses the results of the investigation into the association between media articles and annual report disclosures.

7. Results

Table 1 provides the descriptive statistics derived for the variables used to test Hypothesis 1, while Table 2 provides the descriptive statistics derived for the variables used to test Hypothesis 2.

Prior to reviewing the results relating to the two hypotheses, it is interesting to note from Table 1 that there was a general trend of increasing environmental disclosures across all industries, consistent with the results in Deegan and Gordon (1996). The same trend was also found when only positive environmental disclosures are considered (Table 2). This would be expected, given the relative absence of negative environmental disclosures within the sample companies' annual reports (as previously discussed).

For all industries, the extent of corporate disclosure and the number of newspaper articles in 1993/94 (the latest data year) was greater than it was in 1981/82 (the earliest data year). However, the level of increase was not uniform from period to period. This is particularly the case when we compare the statistics for the 1990/91 and 1993/94 years. Reviewing Table 1 and Figures 1 and 2 we find that for this period the number of media articles relating to the environment decreased for four out of nine of the industries, whilst the mean words of annual report environmental disclosures decreased for six out of nine of the industries. It is difficult to determine the factors that would cause periodic increases or decreases in media coverage and consequently, community concern. Detailed consideration of this issue is really beyond the scope of this paper. Nevertheless, we conjecture there could have been heightened environmental interest by the media (which is hypothesised to lead to increased corporate disclosures) in the period leading up to the 1992 Rio Earth Summit. Some time following the summit (such as the 1993/94 year), the media may not have had the necessary encouragement or impetus to maintain the extent of its media coverage directed towards environmental issues. The effect of this may have caused reduced media coverage, and as hypothesised, a consequential effect of reduced corporate environmental disclosures. The corporate environmental disclosures made by the sample firms is graphically illustrated in Figures 1 and 2.

Consistent with Hypothesis 1 it is predicted that if there is greater community concern about issues pertaining to the environment, a result of increased media attention, then such increased concern should be matched by greater corporate environmental disclosures. Spearman rank-order correlation tests are applied to each of the industries selected for this study to measure the degree of association between the media articles relating to the environment, and the average industry

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[11] It should be noted at this point that we are not looking for correspondence between specific environmental issues addressed in the media article and the issues addressed by way of environmental disclosures within the annual report.

[12] In circumstances where a monetary value is expressed as a number within a sentence, the number is counted as a single word in this study and classified as positive or negative depending upon its context.

[13] A subset of media articles and corporate environmental disclosures were reviewed by both researchers. The measures derived did not significantly differ.

Table 1
Media articles and mean environmental disclosures

Year	*1981-1982*	*1981-1982*	*1984-1985*	*1984-1985*	*1987-1988*	*1987-1988*	*1990-1991*	*1990-1991*	*1993-1994*	*1993-1994*
Industry	Media article total	Mean words	Media article total	Mean words	Media article total	Mean words	Media article total	Mean words	Media article total	Mean words
Chemicals	12	27.75 (28.13)	12	50.25 (31.62)	25	203.25 (238.9)	29	331.5 (323.6)	33	269 (100.6)
Forestry & forest products	10	89 (89.86)	19	49.25 (57.89)	45	222 (147.1)	142	556.25 (741.6)	75	245.25 (391.5)
Gold	0	0 (0.00)	2	48.5 (48.5)	5	138.5 (16.5)	7	1820.50 (1370)	5	487 (157)
Oil and gas	9	0 (0.00)	1	114.5 (73.03)	6	81 (77.88)	38	166.5 (77.67)	18	186 (80.57)
Other metals general	12	200.25 (120.8)	13	101 (89.21)	23	204.75 (161.8)	39	649.25 (321.3)	69	840 (457.4)
Pastoral and agricultural	5	27.5 (7.5)	8	44 (44.0)	2	33.5 (33.5)	11	179.5 (46.5)	14	97.5 (97.5)
Sand mining	4	62.5 (26.5)	3	120 (90.0)	6	365 (37.0)	11	344.5 (12.5)	8	241 (137.0)
Solid fuels	5	61.5 (59.79)	3	42.5 (26.55)	0	73.25 (68.37)	10	296 (242.1)	19	240 (104.6)
Uranium	8	532 (0.00)	7	578 (0.00)	8	485 (0.00)	13	653 (0.00)	17	1134 (0.00)

Note: The figures in parentheses represent standard deviations. As the disclosure measures for the uranium industry come from one company only (Energy Resources of Australia Ltd), the standard deviation is zero.

environmental disclosure.[14] The results for the testing of Hypothesis 1 are provided in Table 3.

In six of the nine industries examined in this study there was a significant correlation between the levels of media attention, and the quantity of corporate environmental disclosures. A significance level of 10% has been chosen as the cut-off point in determining whether the hypotheses of this study are supported. In all cases, the correlation coefficient was in the predicted direction and at least of the magnitude of +0.5. It should be acknowledged that with only five observations for each industry (these consisting of the mean environmental disclosures in each year, and the total number of media articles in each year), the data will be biased against finding significant results. For this reason, graphical representations of the data were also reviewed (they are not reproduced in this paper).

The graphs utilised the data provided in Table 1 and showed, by respective industry, the movements in the mean total environmental disclosures (measured by words), and the movement in the number of media articles relating to the environment. A review of the graphical representations indicated that across the industries there was a general trend of increases in both media attention and annual report disclosure across the period of the study. In a number of the industries the changes in media attention and corporate disclosures greatly mirror one another—a finding consistent with Hypothesis 1.

Having provided the results of Hypothesis 1 we can now consider the results for Hypothesis 2. Hypothesis 2 takes into account the effect that negative media coverage may have on the levels of positive corporate environmental disclosure within each industry. This hypothesis predicts that whenever an industry experiences higher (lower) levels of negative media coverage concerning the industry's environmental implications, corporations representing the industry will provide higher

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[14] In circumstances where data are parametric, the most common test for correlation is the Pearson product-moment test. However, the data in this study violate the assumption of normality and therefore the Spearman rank order correlation test is considered to be appropriate under such circumstances. This violation is determined by using the guidelines of Foster (1986, p106) where it is suggested that normality can be accepted where skewness is less than +/− 0.5 and kurtosis is less than +/− 1. The data used within this study did not fit within these bounds.

Table 2
Negative media articles and mean positive environmental disclosures

Year	*1981-1982*	*1981-1982*	*1984-1985*	*1984-1985*	*1987-1988*	*1987-1988*	*1990-1991*	*1990-1991*	*1993-1994*	*1993-1994*
Industry	Negative media articles	Mean positive words	Negative media articles	Mean positive words	Negative media articles	Mean positive words	Negative media articles	Mean positive words	Negative media articles	Mean positive words
Chemicals	10	27.75 (28.13)	9	50.25 (31.62)	22	196.25 (227.8)	21	331.5 (323.6)	22	263.75 (99.4)
Forestry & forest products	6	89 (89.86)	14	49.25 (57.89)	24	191.75 (167.9)	83	550.75 (732.1)	46	245.2 (391.5)
Gold	0	0 (0.00)	1	48.5 (48.5)	2	110.5 (44.5)	6	1820.50 (1370)	5	487 (157)
Oil and gas	7	0 (0.00)	1	114.5 (73.02)	5	81 (77.87)	26	166.5 (77.67)	10	186 (80.60)
Other metals general	8	200.25 (120.8)	11	101 (89.21)	17	190.5 (140.3)	18	642.25 (322.7)	53	778 (362.5)
Pastoral and agricultural	2	27.5 (7.5)	7	44 (44.0)	1	33.5 (33.5)	5	160.5 (65.5)	9	97.5 (97.5)
Sand mining	4	62.5 (26.5)	3	85.5 (55.5)	6	325.5 (2.5)	9	344.5 (12.5)	6	241 (137)
Solid fuels	4	61.5 (59.79)	2	42.5 (26.54)	0	67.5 (71.72)	4	296 (242.1)	12	240 104.6)
Uranium	6	532 (0.00)	7	538 (0.00)	5	485 (0.00)	11	653 (0.00)	13	1134 (0.00)

Note: The figures in parentheses represent standard deviations. As the disclosure measures for the uranium industry come from one company only (Energy Resources of Australia Ltd), the standard deviation is zero.

Figure 1
Mean total words by industry for the chemical, forestry and forest products, gold, and oil and gas industries

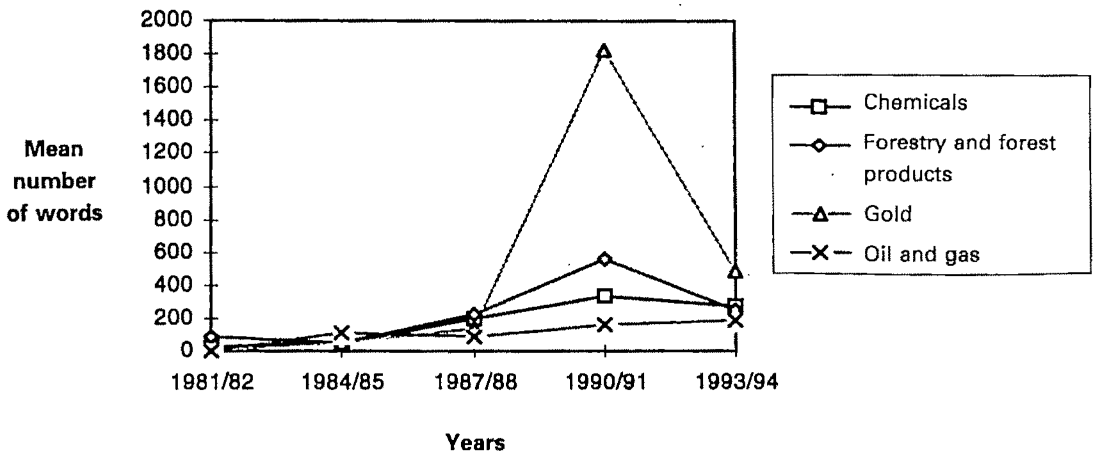

Figure 2
Mean total words by industry for the other metals general, pastoral and agricultural, sand mining, solid fuels, and uranium industries

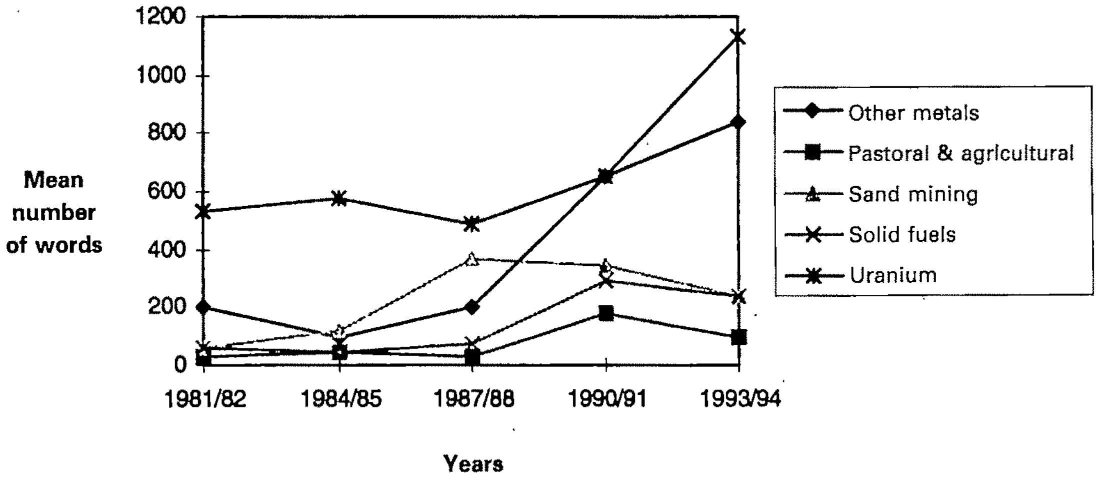

Table 3
Test results by industry for Hypothesis 1—Spearman rank-order correlation between mean total environmental disclosure and media articles

Industry	*Spearman rank-order correlation coefficients*	*Significance (one-tailed test)*
Chemicals	+0.8721	0.027
Forestry and forest products	+0.9000	0.018
Gold	+0.9747	0.002
Oil and gas	+0.5000	0.195
Other metals general	+0.9000	0.018
Pastoral and agricultural	+0.8000	0.052
Sand mining	+0.6000	0.142
Solid fuels	+0.6000	0.142
Uranium	+0.6669	0.100

(lower) levels of positive environmental disclosures.

As with Hypothesis 1, the data collected for each industry covering the period of the study is subjected to statistical testing using the Spearman rank-order correlation test. Results relating to the tests for each industry are summarised in Table 4.

The results in Table 4 indicate that in five of the nine selected industries in this study there is significant correlation between the levels of negative media attention and the quantity of positive corporate environmental disclosure. As for Hypothesis 1, the small number of observations (five years) mitigated against finding significant results. All correlations were in the predicted direction and eight out of the nine correlations were at least +0.5. Appendix 2 provides a graphical representation of the relationship between negative media articles and positive environmental disclosures. Appendix 2 shows that for a number of industries the changes in negative media articles are closely mirrored by changes in positive corporate environmental disclosures—a result consistent with Hypothesis 2.

8. Summary and discussion

This study examines, by industry, the relationship between print media attention to environmental issues and the extent of corporate annual report environmental disclosures, to determine if the relationship can be explained within a legitimacy

Table 4
Test results by industry for Hypothesis 2—Spearman rank-order correlation between mean positive environmental disclosure and negative media articles

Industry	*Spearman rank-order correlation coefficients*	*Significance (one-tailed test)*
Chemicals	+0.5643	0.161
Forestry and forest products	+0.9000	0.018
Gold	+1.0000	0.000
Oil and gas	+0.5000	0.195
Other metals general	+0.7000	0.094
Pastoral and agricultural	+0.6000	0.142
Sand mining	+0.8721	0.027
Solid fuels	+0.4617	0.217
Uranium	+1.0000	0.000

theory framework. Annual report environmental disclosures, and print media data are collected for five individual years between the period 1981 to 1994. The extent of corporate annual report environmental disclosures is measured by words and classified into positive or negative disclosures to give an average measure by industry.

Print media articles relating to the environment are classified by industry and by whether the articles provided a favourable, neutral or unfavourable view of the industries' activities. The print media environmental articles are used as a measure of public concern regarding the environmental implications of the industries. Such a measure is used because, consistent with media agenda setting theory, it is considered that media attention to environmental issues will impact on community expectations.

According to legitimacy theory, used within the context of this study, corporate management will react by increasing the level of corporate environmental disclosures if they perceive that the 'legitimacy' of their organisation/industry is threatened because of public concern over the environmental implications of the organisation/industry. This form of corporate behaviour is consistent with the findings of previous studies conducted by Hogner (1982), Patten (1992), Deegan and Gordon (1996), and Deegan and Rankin (1996).

Hypothesis 1 predicted that higher (lower) levels of media attention would be associated with higher (lower) levels of corporate environmental disclosure. The hypothesis was tested by industry using five years of observations (of corporate environmental disclosures and media articles). With only five years of observations for each industry, the correlation statistics would be biased against finding significance. Nevertheless, the testing procedure enabled an examination of whether there appears to be an association between media attention and corporate disclosure to be made. The results indicated that for all nine industries the correlation coefficient was in the predicted direction and of the magnitude of at least +0.5. Significant results were found for six industries, these being chemicals, forestry and forest products, gold, other metals - general, pastoral and agricultural, and uranium, thus confirming a legitimation motive by corporate management in these industries.

The finding that Hypothesis 1 was not supported across all industries may, in part, be due to a number of factors. We have not factored in any lag effects when considering the relationship between media attention and subsequent corporate disclosure. If such a lag did exist across all or some of the industries then this would mitigate significant findings. Further, perhaps the media is not as effective in some industries as others in shaping community expectations or, more to the point, corporate management within some industries may not consider the media to have such influence. Also, there is a possibility that dominant players in some industries had strategically planned the timing and format of their environmental disclosures in a bid to manipulate or shape community perceptions and concerns (as would be suggested in politial economy theory—see Gray, Owen and Adams, 1996), rather than simply reacting to changes in community concerns, as would seem to be suggested by legitimacy theory. Hence, assuming that a relationship between media attention and annual report environmental disclosures holds across all industries may be a simplistic assumption. This could be the subject for further research.

Hypothesis 2 predicted a positive relationship between higher (lower) levels of negative media attention, and higher (lower) levels of positive annual report environmental disclosures. As for Hypothesis 1, there were only five years of observations for each industry, which mitigated significant results. Nevertheless, in eight out of the nine industries the correlation statistics were at least

+0.5. Significant findings supportive of the hypothesis were provided by five of the nine industries, thus confirming a legitimation motive by corporate management in those five industries.

In comparing the results of Hypothesis 1 and Hypothesis 2 it was found that for both hypotheses, significant results were found for the forestry and forest products; gold; other metals—general; and uranium industries. However, chemicals, and pastoral and agricultural industries only generated significant results for Hypothesis 1, while sand mining only generated significant results for Hypothesis 2. The reasons for such a difference are not clear, but are worthy of further research.[15]

There are a number of possible limitations which may impact upon the results of this study. One relates to the unavailability of media sources. As stated previously, access to a number of print media sources was restricted due to the unavailability of the information. It is not clear, however, in which direction this restriction would bias the results.

It has also been assumed that all print media sources have the same perceived ability to impact community expectations and, as a result, each article was equally weighted. This may not be the case, however, there is limited guidance available to indicate which Australian media sources have the greater relative impact.

We have also not controlled for issues such as the prominence (for example, placement at the front page versus the middle or back page, or the size) of the respective media article. Again, there is limited theoretical guidance to advise how to differentially weight the respective articles in terms of their prominence within the print media and importantly, how the prominence impacts on how salient a particular issue is for the reader. Some researchers have considered prominence in terms of placement only, that is, whether it is in the front sections of the paper (Salwen, 1988). Others, for example Wanta (1965), have considered the impacts of photographs on increasing the reader's interest in a particular issue. Further, issues such as the size of the headline have also been found to be important (for example, see Ader, 1995). Research currently being undertaken by one of the authors draws upon various prior studies of article prominence (where the results are often mixed) to construct a media prominence score. This scoring system takes into account the placement of the article (for example, front page, back page), the width of the headline, the size of the articles, and the inclusion of photographs.

As noted above, another possible limitation of this study is that it ignores potential lag effects. That is, it has been assumed that management adjusts its disclosure policies on the basis of the media attention received by its corporation's industry in the same year as the annual report. No adjustment has been made for whether the article appeared earlier or later in the year preceding the release of the organisation's annual report. Further, it has also been assumed that there is no lag between media attention and changes in community concerns.[16] As there are three years between each of the observations used in this study it is difficult to test for a lag effect. Future research could help to resolve the issue by reducing the time period between each of the observations.

We have also not related media attention to specific environmental issues (such as ozone depleting activities) with specific types of corporate environmental disclosures. Rather, we have simply identified all environmental media articles, and all annual report environmental disclosures and examined the association between them. Further research could implement a more refined analysis, though such an analysis would take considerably longer in terms of the time taken to collect and analyse the data.

Even given the above limitations, it is the authors' view that this study has contributed to the literature because it has shown, unlike any other known study, that the environmental disclosure strategies of management within some industries is associated with the extent of media attention. More specifically, variations in media attention appear to be associated with variations in corporate disclosures. It has further contributed to the literature by showing that not all industries react in the same manner to variation in the level of media attention. Taken together, the results provide a further resource for those individuals/organisations attempting to explain or understand what drives particular entities to voluntarily disclose environmental information in their annual report.

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[15] As Hypothesis 2 represents a refinement of Hypothesis 1 it may have been anticipated that more industries would have generated significant results for Hypothesis 2 than Hypothesis 1, but not vice versa.

[16] Ader (1995) argues that although the results are mixed, the time lag between changes in the media agenda and changes in the public agenda are typically less than about four months.

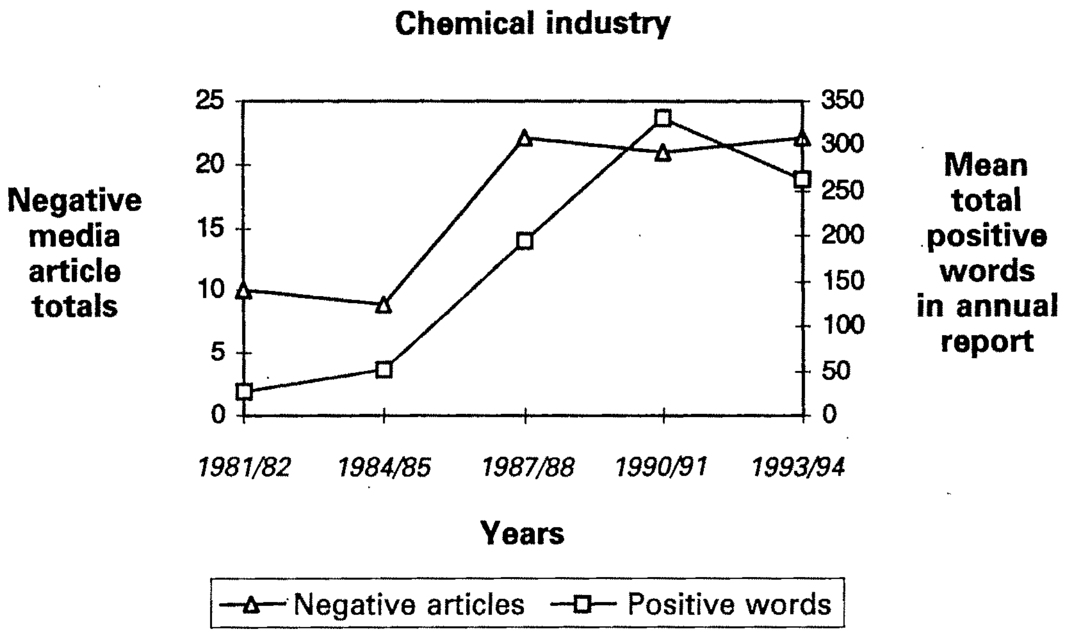
Appendix 1

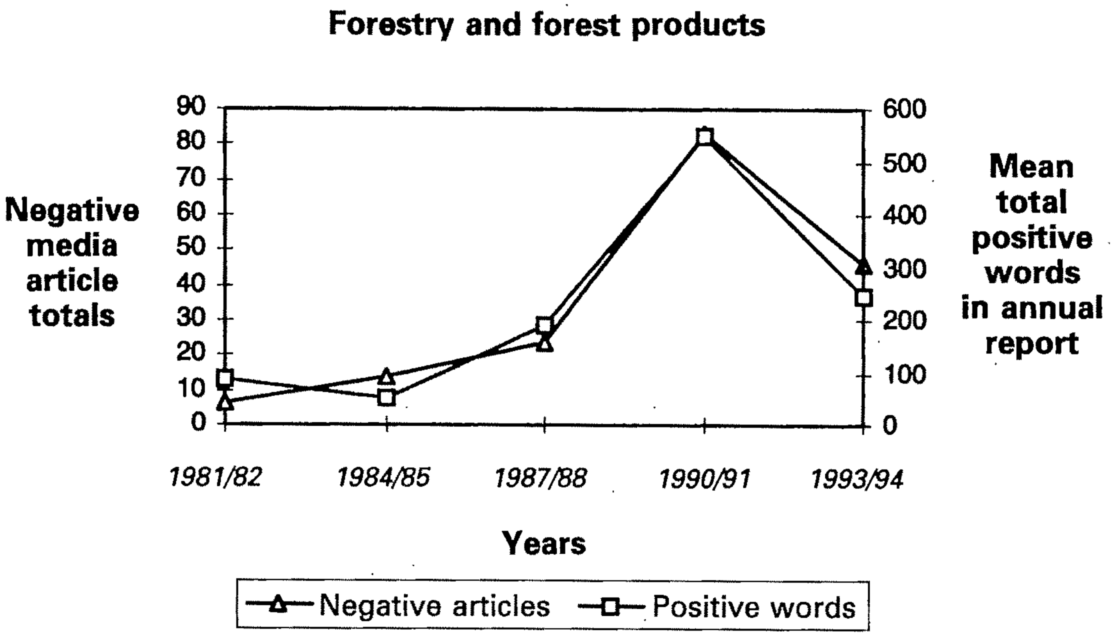
Sample companies

Australian Chemical Holdings Ltd	Chemicals
Gibson Chemical Industries Ltd	Chemicals
ICI Ltd	Chemicals
Incitec Ltd	Chemicals
Amcor Ltd	Forestry and forest products
Gunns Kilndried Timber Industries Ltd	Forestry and forest proudcts
Spicers Paper Ltd	Forestry and forest products
Wesfarmers Ltd	Forestry and forest products
Gold Mines of Kalgoorlie Ltd	Gold
Renison Goldfields Ltd	Gold
Ampol Petroleum Ltd	
Magellan Petroleum Australia Ltd	Oil and gas
Santos Ltd	Oil and gas
Woodside Petroleum Ltd	Oil and gas
CRA Ltd	Other metals (general)
MIM Holdings Ltd	Other metals (general)
North Broken Hill Ltd	Other metals (general)
Western Mining Corporation Ltd	Other metals (general)
Australian Agricultural Company Ltd	Pastoral and agricultural
CSR Ltd	Pastoral and agricultural
Consolidated Rutile Ltd	Sand mining
Westralian Sands Ltd	Sand mining
Allied Queensland Coalfields Ltd	Solid fuels
Coal & Allied Industries Ltd	Solid fuels
Meekatharra Minerals Ltd	Solid fuels
Oakbridge Ltd	Solid fuels
Energy Resources of Australia	Uranium

Appendix 2

Graphical representations of the relationship between negative media attention and positive annual report environmental disclosures





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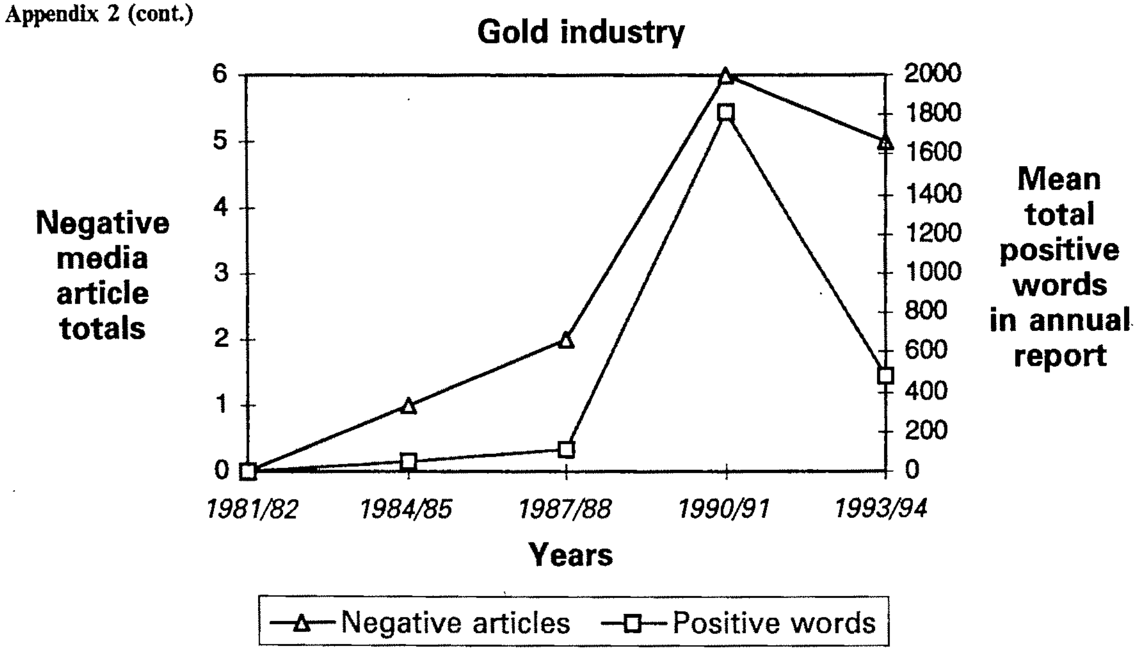

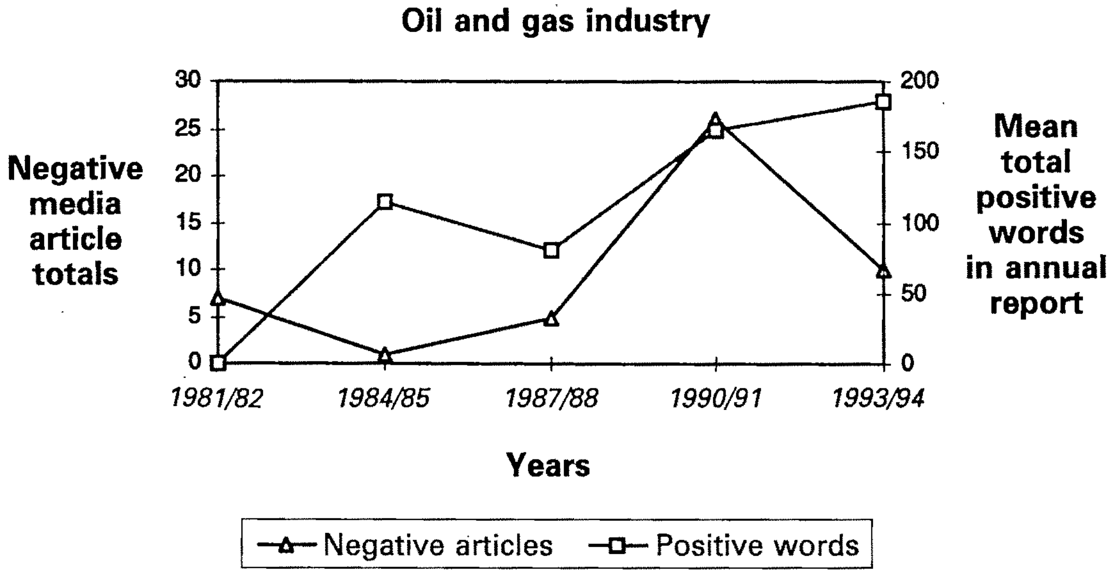

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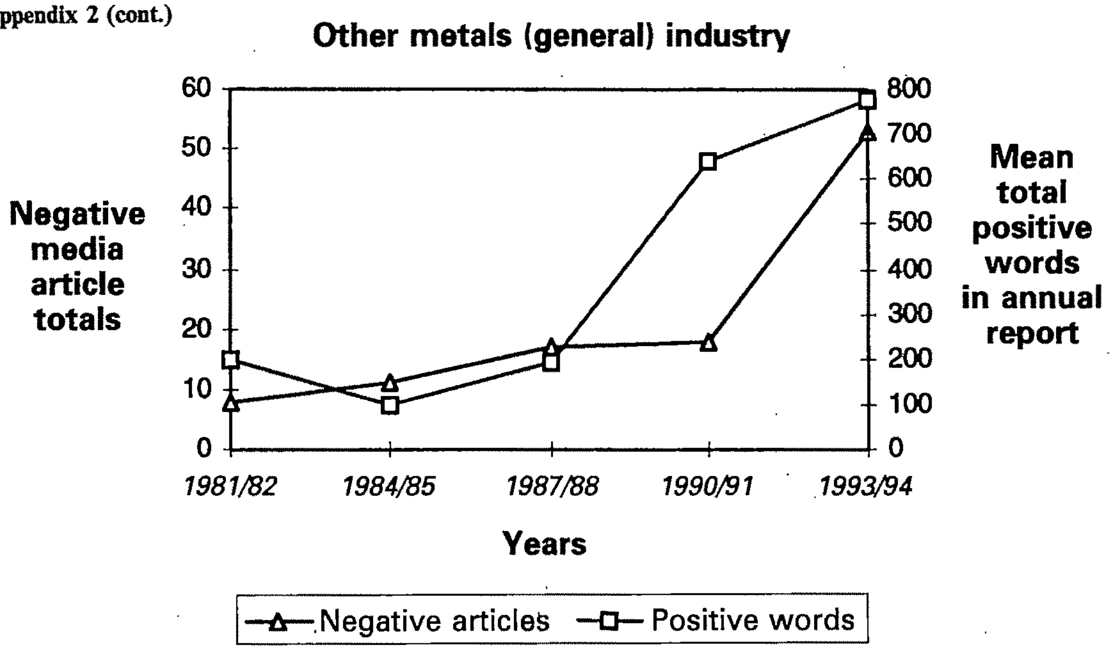

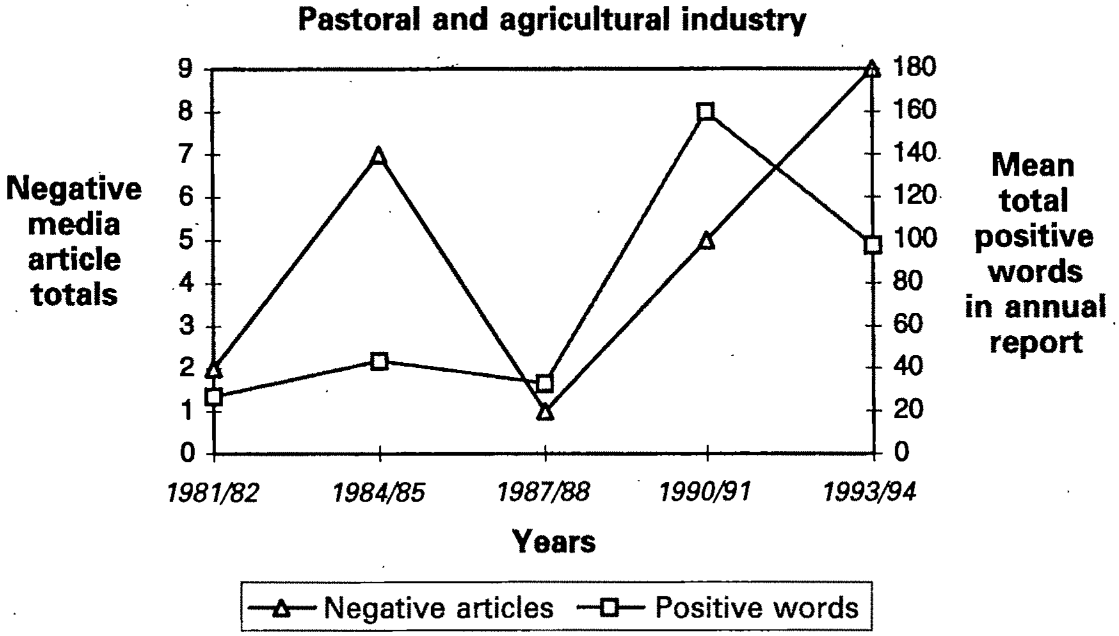

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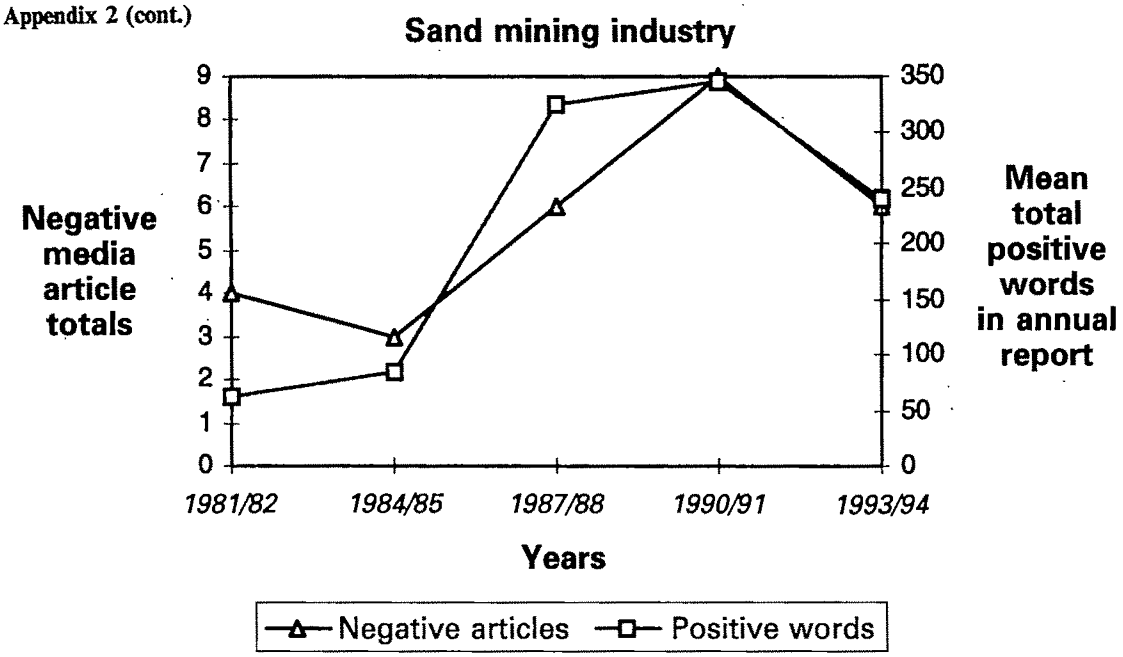

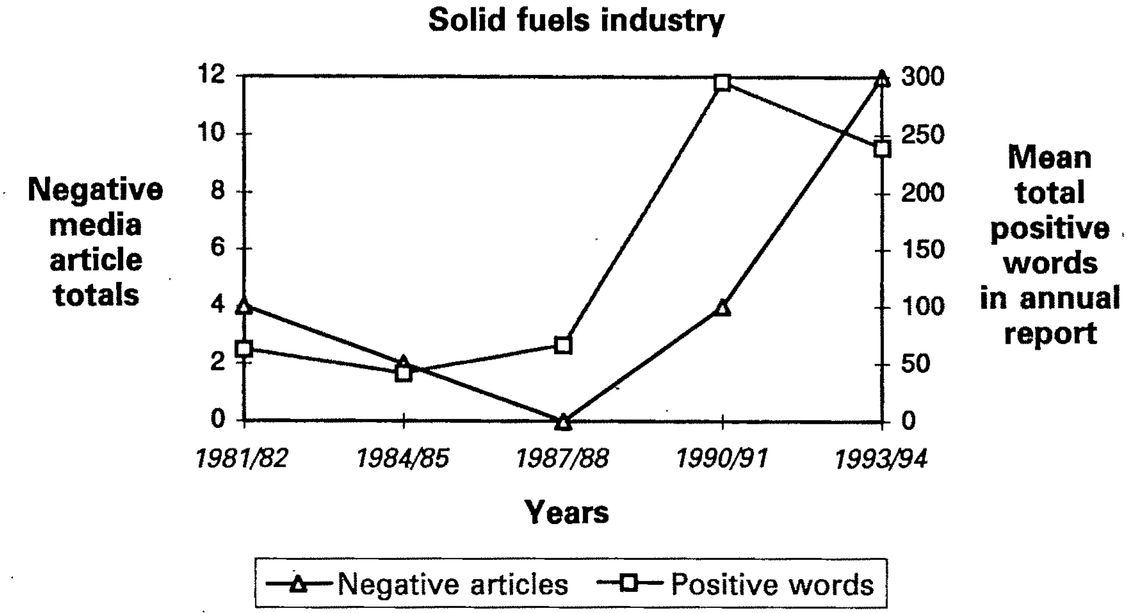

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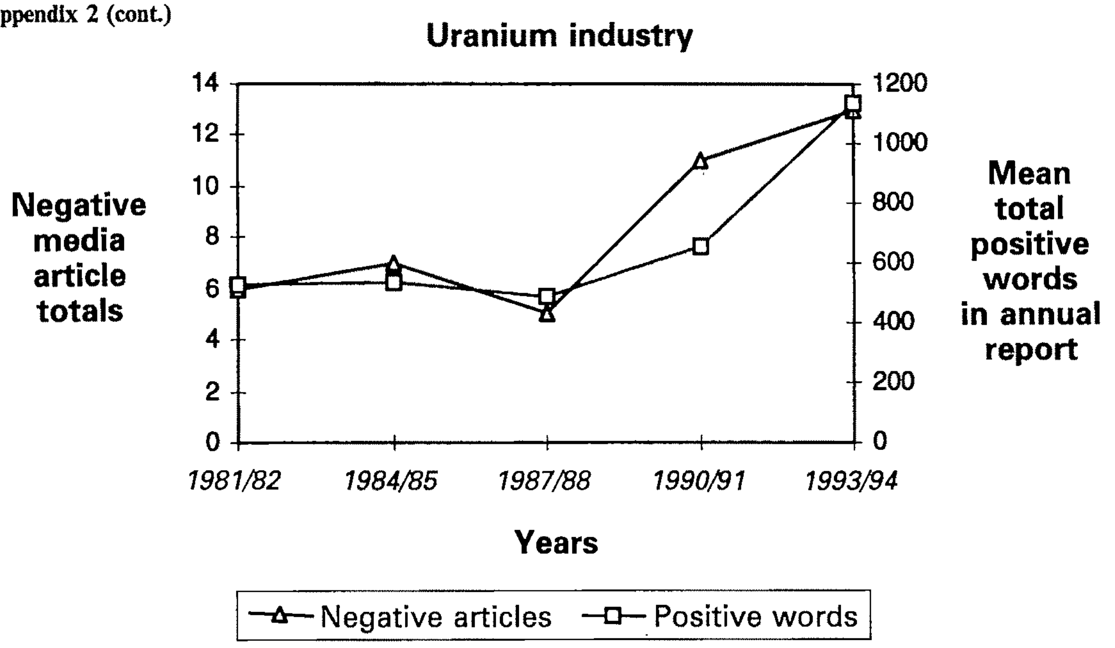

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Perceptions of the Royal Mail case in the Netherlands

Kees Camfferman*

Abstract—The 1931 Royal Mail case, as a landmark event in the history of British accountancy, did not go unnoticed in the Netherlands. Awareness of the case is reflected by a fairly wide scattering of references in contemporary Dutch documentary sources, notably in the literature of the auditing profession. Because of this, the case provides a convenient opening for studying the comparative development of accounting and auditing in Britain and the Netherlands. This paper documents Dutch references to the Royal Mail case from the 1930s to the early 1950s and it presents an interpretation of the pattern and nature of these references. The materials brought together in this paper show that in interpreting the Royal Mail case, Dutch auditors paid more attention to general issues of auditor responsibility than to the issue of secret reserve accounting with which the case is traditionally associated. The case provided support for those who argued with Limperg that the Dutch profession was ahead of Britain in its views on auditor responsibility.

1. Introduction

The importance of the Royal Mail case to British[1] accountancy is well established in the literature. According to Edwards (1989: 127), 'the criticism aroused by the [Royal Mail case] probably had a greater impact on the quality of published data than all the Companies Acts passed up to that date'. Equally forceful is F.R.M. de Paula's late-1940s image of the Royal Mail case which 'fell like an atomic bomb and profoundly disturbed both the industrial and the accountancy worlds' (de Paula, 1948a: 265). The case drew attention to deficiencies in British financial reporting and auditing, and provided an impetus for renewal and modernisation.

Given this impact, it is not surprising that the Royal Mail case attracted some attention in the neighbouring Netherlands as well, and that it left its traces in the Dutch professional auditing literature. This paper documents Dutch reactions to the Royal Mail case from 1931 to the early 1950s, and demonstrates the fairly large extent to which Dutch auditors knew about, and took an interest in, British affairs. The case invited comparisons between the state of accounting and auditing in the Netherlands and in Great Britain, and it is for that reason that a study of Dutch reactions to the Royal Mail case provides useful insights into the comparative history of accountancy in the two countries.

The Royal Mail case is traditionally associated with the demise of secret reserve accounting as a respectable reporting practice. This might suggest the hypothesis that the perceived significance of the case in the Netherlands would also be phrased primarily in terms of the issue of secret reserves. However, this paper argues that at least initially the case was interpreted mainly in terms of a more general and ongoing domestic discussion on the nature of the responsibility of the auditor. As such, the case could serve as support for the view that at a fundamental level, Dutch standards of auditing were higher than those in Britain. Rather later, following the War, did the specific implications of the case for secret reserve accounting become a topic of discussion. In terms of de Paula's bombing imagery, it can be said that, although Dutch auditors considered themselves well-protected from the initial blast by their high standards of professionalism, this did not shield them from the fallout which, during subsequent years, influenced long-term developments in British accountancy.

This paper is organised as follows: Section 2 briefly reviews the facts of the Royal Mail case, and the consequences attributed to it in the English-language literature; Section 3 discusses in general the extent of knowledge of the case in the Netherlands, and Sections 4 and 5 contain the core of the paper. They show how references to the Royal Mail case in the Netherlands fitted into the ongoing discussion on professional standards in that country. Section 6 contains some concluding remarks.

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[1] This paper uses 'Britain' and 'British' as a matter of convenience and not with the intention of restricting the scope of the paper precisely to Great Britain. Similarly, when references to 'England' occur in literal translations from the Dutch literature, it should not, as a rule, be assumed that the Dutch authors wanted to restrict their statements to that part of the UK.

2. The Royal Mail case

The facts of the case against the chairman of the board of directors and the auditor of the Royal Mail Steam Packet Company[2] (*Rex v. Lord Kylsant, and Another*) are well documented in the English-language literature.[3] In brief, the effect of the Royal Mail's accounting policies during the 1920s was to hide a decline in the company's fortunes. In particular, a redundant provision for wartime taxation was gradually released into income. In this way, losses were transformed into apparent profits. This practice was not evident from the published financial statements, which condensed income into an 'omnibus' item labeled 'Balance for the year, including dividends on shares in allied and other companies, adjustment of taxation reserves, less depreciation of the fleet, etc.'

In 1926, despite an undisclosed trading loss of £507,104, the profit and loss account showed a profit of £478,563, mainly because of an 'adjustment' of taxation reserves of about £750,000 (Green and Moss, 1982: 72). As the Royal Mail Group's affairs deteriorated, the Treasury became involved in the task of restructuring its finances in 1929–1930. Information provided to preference shareholders in February 1931 in order to gain their support for extending a moratorium provided the feeding ground for rumours that there might be something wrong with the Royal Mail Company's published accounts. Members of the Parliamentary opposition pressed the Government into deciding on a prosecution, and in July 1931 both the chairman of the board of directors, Lord Kylsant, and its auditor, Harold Morland, were tried on charges of publishing false information. In the end, both men were acquitted of charges relating to the 1926 and 1927 annual reports, but the director was found guilty with regard to unaudited information published in a 1928 prospectus. The acquittal was largely based on the testimony of expert witnesses from the auditing profession.[4] Chief among these was a former president of the English Institute (ICAEW), Lord Plender, who asserted that the succinct reference to 'adjustment of taxation reserves' to describe the nature of the profit balance was in accordance with best current practice.

As the Royal Mail case was 'one of the Old Bailey's most publicised cases in the inter-war period' (Green and Moss, 1982: 141), it is not surprising that it is generally credited with a great impact on British auditing and financial reporting. Although, because of the acquittals with respect to the financial statements, there were no direct legal implications, the case did bring about a process of reflection and debate on the state of British accountancy. Within the auditing profession, the existence of considerable differences of opinion hindered the emergence of an unambiguous reaction: 'Given that many leading professional accountants shared the view of the expert witnesses in the Royal Mail case that there was nothing inherently wrong with the use of secret reserves, the professional response to the case could only be a muddled and ineffective one' (Napier, 1995: 273). Nevertheless, two distinct consequences began to emerge towards the end of the 1930s.

The first consequence, at least the one which 'has received the bulk of the accounting historians' attention' (Edwards, 1989: 232), was a change in attitude towards secret reserve accounting. Even though the formation of secret reserves remained acceptable for a while, their undisclosed release into income ceased to be part of acceptable practice (e.g. Rowland, 1939: 178). The 1945 report of the Committee on Company Law Amendment (chaired by Mr Justice Cohen), and the wording of the subsequent Companies Act 1947 (in particular Schedule Eight, 27(2)), strongly suggested that the existence of secret reserves, rather than merely their undisclosed release into income, was sufficient to jeopardise the 'true and fair view' to be given by the financial statements (cf. Jones, 1995: 157).

A second important consequence of the Royal Mail case was a change in the perception of the auditor's responsibility. Prior to the case, there was a tendency to interpret the auditor's responsibility in a limited way by a strict adherence to what was specified in the law and in legal precedent. During the 1930s, however, perceived responsibilities expanded because of the increasing recognition of the moral and ethical responsibilities of the auditor (Edwards, 1989; Napier and Noke, 1992).

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[2] In the remainder of this paper, this company and its subsidiaries are referred to as 'the Royal Mail Company'. This was the combination of companies to which the trial ('the Royal Mail case') was confined. The Royal Mail Company was part, however, of a far wider network of companies which, following Green and Moss (1982), is referred to as the Royal Mail Group.

[3] See Arnold (1991); Bircher (1991); Edwards (1976, 1989); Green and Moss (1982); Jones (1995).

[4] Ashton (1986) attributes the outcome of the trial in part to a weak handling of the case by the Attorney-General, in particular regarding the use made of the witnesses: 'The AG appears to have had no clear strategy in relation to the points that should have been brought out in Lord Plender's evidence. Indeed, an uninformed observer might have thought that he was a defence, rather than a prosecution witness.' (p. 9)

It may be true, as Bircher (1991) has argued, that the Royal Mail case was only one element of a growing dissatisfaction with the current state of things that eventually brought about these and other changes in British accountancy. Moreover, the case may have been influential for the wrong reasons. Arnold (1991: 203) has claimed that the trial proceedings 'exaggerated and distorted the contributions of secret reserve accounting to the smoothing of RM's profits over the period 1915–27'. Yet there seems to be no doubt that, in the minds of many contemporaries, the case was a conspicuous cause of change. It is because of this perceived significance as a *cause célèbre* that an investigation is justified of the reactions it elicited in the Netherlands.

3. Awareness of the Royal Mail case in the Netherlands

One can safely assume that the Royal Mail Group was well known in the Netherlands before its troubles began. Many companies of the far-flung Group acted as competitors, partners, clients or suppliers of the Dutch shipping industry.[5] The financial problems of the Royal Mail Company and the subsequent trial attracted considerable attention in the newspapers. For the purposes of this paper, four business-oriented daily newspapers were searched and it was found that all reported frequently on the restructuring of the company and on the trial during the period of May to July 1931. In a number of instances, the events were apparently considered to be of sufficient importance to be reported on the front page.[6] While much of the coverage was relatively short and of a factual nature, there were also some background articles and commentaries.

Following coverage in the press, the case also made its way, at a slower pace, into the Dutch professional accountancy literature from the fall of 1931 onwards. In the distribution of references to the case over time, a simple pattern is unambiguously present, as these references occur in two distinct phases. First, during the period from 1931 to 1935, a total of 14 publications were found in which one or more references to the Royal Mail case by Dutch authors (or quoted speakers) occurred.[7] From 1936 to 1945, only one reference to the Royal Mail case was found in the Dutch literature, in an article by a British author (Rowland, 1939). But, after this period of silence, 10 more references were found, dating from the period 1946–1952.[8] References to the Royal Mail case after the early 1950s are scarce.[9] What is probably the last reference appeared in a 1970 encyclopaedia of business administration and accountancy, where the case was characterised as 'being of purely historical significance' (de Jong, 1970).

From the absolute number of references it can immediately be seen that the Royal Mail case never dominated the Dutch auditing literature of the 1930s and 1940s. But, even in the absence of comparable statistics, it seems fair to state that the case drew rather more, and certainly longer-lasting attention in the Dutch literature than other affairs of the period such as the Kreuger & Toll affair (Flesher and Flesher, 1986).

It can therefore be inferred that, from 1931 onwards, there was substantial written information about the case available to Dutch auditors. Those who followed the literature could gain a reasonable understanding of the significance of the case for British accountancy. In addition to these sources, the importance of the Royal Mail case would have been brought to attention during the 1933 International Congress on Accounting in London[10], at which a Dutch delegation of considerable size and quality attended.[11] The participants could learn directly about the case in the discussion from the paper presented by Henry Morgan (who had been an expert witness for the defence at the trial) (Morgan, 1933), and from the subsequent debate in which two Dutch delegates participated. Those who stayed at home could do so through a summary of the proceedings published in one of the main accountancy journals (Spangenberg, 1934).

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[5] For example, Green and Moss (1982: 56) describe the competition with the Holland-Zuid-Afrika Lijn during the 1920s. The Holland-Amerika Lijn, a major Dutch liner shipping company, operated a joint service to the Pacific with the Royal Mail Steam Company. It also had a longstanding relation with the Harland & Wolff shipyard (a key part of the Royal Mail Group) from which it ordered a number of hulls, including that of its flagship *Statendam (III)* (Wentholt, 1973). Incidentally, Green and Moss (1982: 59) appear to confuse the Dutch company with the Hamburg-Amerika Line in this regard.

[6] See *Algemeen Handelsblad*, 14 May, p. 1 and 3; 16 May, p. 2; 2 June, p. 1; 3 June, p. 1, 2, 8; 9 June, p. 3, 8; 11 June, p. 3, 6; 15 June, p. 6; 23 June, p. 3 and 8; 30 June, p. 4; 30 July, p. 4 (all references except 2 and 15 June are to the morning edition). Coverage in *Nieuwe Rotterdamsche Courant* was mainly based on the same sources as used in *Algemeen Handelsblad*. See also *De Telegraaf*, 15 May (evening) p. 17; 3 June (evening) p. 14; 23 June (morning) p. 3; 13 July (morning) p. 1; 30 July (evening), p. 13; and *De Maasbode*, 9, 11, 16 June and 21 July (morning editions).

[7] Hageman (1932a,b, 1935); de Kat (1932); Keuzenkamp (1932); Polak (1933); van Rietschoten (1932); Roosegaarde Bisschop (1932); Spangenberg (1934); Sternheim (1931) and van Dien, quoted in Morgan (1933). Sternheim (1931) and Hageman (1932a,b) were reproduced in their entirety in the November 1931, May 1932 and June 1932 issues of the journal *De Naamlooze Vennootschap*.

[8] Dijker (1948a); Hageman (1947); Hinnen (1948a,b); Hogeweg (1948); NIVA (1946); Porrey (1950); Spinosa Cattela (1948); Stokvis (1950); Tempelaar (1952a), with Spinosa Cattela (1948) reprinted in 1952.

[9] Foppe (1955); de Jong (1970)

[10] In 1936, F.R.M. de Paula wrote: 'In my opinion, the proceedings of that [1933] congress represent a contribution of the first importance in the world of accountancy. They reveal clearly that the profession is moulding definite principles in regard to the serious problems involved in the *Royal Mail Steam Packet Company* case' (de Paula, 1948b: ix).

[11] With 23 participants each, the Netherlands and Germany provided the largest foreign delegations after the US (with 32).

There are also indications that Dutch auditors did indeed avail themselves of the above opportunities. Knowledge of the Royal Mail case played a role when auditors gathered for discussion. In the summer of 1932, the subject was sufficiently well known to influence the choice of topic for the annual study meeting of the Dutch Institute of Auditors (NIVA) (Keuzenkamp, 1932). However, the speaker at the meeting thought it useful to outline the circumstances of the case 'for those who do not know about this trial' (Keuzenkamp, 1932: 30). During next year's meeting in September 1933, it was apparently possible to make a passing reference to the case without giving any details, as if everyone present would be able to understand the implications of the case (Polak, 1933: 28). Although no such references occur in records of meetings during the remainder of the 1930s, the knowledge did not disappear. In 1946 or 1950 it was still possible to make a point during a NIVA membership meeting by making a casual reference to the Royal Mail case (NIVA, 1946; Stokvis, 1950).

4. Initial reactions 1931–1935

This section considers reactions to the Royal Mail case during the early 1930s. It is argued that during this period the case had at best a marginal influence on attitudes towards secret reserve accounting. Instead, it is shown that interest in the case was prompted primarily by its bearing on questions of the general responsibility of the auditor.

4.1. Secret reserves

The Royal Mail case did cause at least some immediate changes in Dutch financial reporting. One Dutch auditor commented in 1932 on his recent observation of

> 'the appearance in a published set of Dutch financial statements of the item "By trading account, including secret reserve transfer", as far as I know a unique occurence in our financial reporting, and apparently inspired by the verdict regarding the Royal Mail Steam Packet Cy.' (Keuzenkamp, 1932: 30)[12]

It seems, though, that this reaction was the exception rather than the rule and that, in general, attitudes towards the formation and use of secret reserves were only marginally affected. To gauge the more typical Dutch perceptions of the Royal Mail case in the early 1930s, a good starting point is the discussion of the case by Ch. Hageman (1932a) published in one of the main professional journals in April 1932.[13] After a discussion of the case, including a numerical analysis and extensive quotes from the proceedings in court, he arrived at the following assessment of the relevance of the case for the Dutch situation:

> Among Dutch auditors, the formation of undisclosed reserves is in general considered as acceptable and in many instances unavoidable....The essential difference of opinion between English auditors and auditors in this country lies, however, in the case that undisclosed reserves are released to profit without any clear indication (as in the case of the R.M.S.P.). In contrast to his English colleague, the Dutch auditor, when he signs the financial statements without qualification, also gives a clean report on the profit and loss account. In the case [of undisclosed releases], therefore, signing without qualification would be indefensible since the profit balance shown does not correspond at all with the true results from operations, and since the auditor would then collaborate, as in the R.M.S.P. case, in invoking a completely incorrect impression of the financial position. According to what appears from the English professional journals, it will after this case be necessary to verify the correctness of the profit and loss account as well, and in so doing adhere to opinions which have existed for a long time in this country. (Hageman, 1932a: 59)

Delegates included partners of the major firms and a number of past and present NIVA presidents.

[12] Keuzenkamp did not identify the company in question, but in the 1931 annual report of Werkspoor N.V., a major engineering firm, the profit and loss account for 1931 did in fact contain precisely this item ('Per exploitatierekening inclusief dotatie stille reserve'). The direction of the 'transfer' was from the reserve to the profit and loss account, in keeping with the context of the Royal Mail case. The item recurred in the 1932 annual report, but by 1933 the secret reserves were apparently exhausted, and a release of open reserves was unable to prevent the profit and loss account from going deeply in the red.

[13] Ch. Hageman (1896–1966) had joined the editorial board of the journal *Maandblad voor Accountancy en Bedrijfshuishoudkunde* in October 1931. Until 1948, he would be section editor of the 'News from abroad' section, which typically contained short clippings from foreign journals with some comments. The article mentioned here, however, was a long leading article.

According to Hageman, therefore, the position on secret reserves that was gradually reached in Britain following the Royal Mail case (their use allowed, but no undisclosed release into income) had already gained acceptance in the Netherlands, owing to the superior notions of proper auditing prevalent in the latter country.

As to the first part of that assertion, it would seem that Hageman, who was at the time not in public practice, was a little optimistic. Views in line with the practices of the Royal Mail Company were aired during the late 1920s, although typically not without opposition (Zeff et al., 1992: 61). In 1929, the *éminence grise* of the Dutch auditing profession, J.G.Ch. Volmer, had dismissed as 'nonsense' and 'academic wisdom' the assertion that the experience of banks and shipping companies since 1921 had shown that openness in the use of secret reserves would have been in the public interest (Volmer, 1929). During a 1929 NIVA study meeting on secret reserves, views had been expressed ranging from wholehearted endorsement to a reluctant acceptance of established practice, and the issue of undisclosed releases had simply not been addressed (van Uden, 1929).

Rather typical seems to have been the position of A. Sternheim, an auditor who published his own journal of financial news and analysis. In 1930 he did not go beyond stating that the attitude of the auditor towards undisclosed releases was 'a difficult issue' (Sternheim, 1930). This position was a little clarified when, in an article commenting on the Royal Mail case, he wrote that 'a release of secret reserves, by which a loss in any year is transformed into a profit, must be disclosed. An interim position seems to be out of the question' (Sternheim, 1931). Rather than rejecting secret reserves or even undisclosed releases of secret reserves, this position merely objected to undisclosed releases in cases where the apparent trend of profits was reversed.

In other frequently used words, secret reserves were disapproved of only when they were 'abused'. This position was apparently typical for the leading members of the Dutch profession throughout the 1930s, who were reluctant to rule out undisclosed releases altogether, let alone prohibit the formation of secret reserves (see Keuzenkamp, 1939; de Vries, 1985: 169–71). An important corollary of this point of view was that the auditor had to determine whether in specific instances there had been any 'abuse' or misleading use of secret reserves. At this point the second part of Hageman's argument (cited above) applies, that Dutch auditors, adhering to higher general standards of auditing, were better prepared to prevent such abuses than their British counterparts.

To understand this assertion, it is useful to take a step back and to review briefly the relations between British and Dutch auditing during the first decades of the century and to consider in particular differences in the legal environment and related differences in reflection on the nature of auditing.

4.2. Dutch and British auditing 1900–1930

There can be little doubt that Britain was the single most important foreign point of reference for the young Dutch auditing profession. The Dutch Institute, founded in 1895, was consciously modelled after the example of similar bodies in Britain (Limperg, 1903). British textbooks played an important part in professional education. The extent to which aspiring auditors were to acquaint themselves with British practices may be gauged from the questions listed in reports of oral examinations organised by the NIVA in 1904:

> 'Have you studied Pixley? Tell us something from the chapter on "Profits available for dividends"....What are the regulations in England concerning the auditor's certificate to the balance sheet?...How would you go about the audit of a savings bank, especially with regard to deposits? How do our English colleagues do that?...Tell us something about English bookkeeping. ...How do the English divide their ledgers?...What does Pixley say about the "Internal Check"?' (Reiman and Nijst, 1906: 284)

Professional education continued to rely heavily on British materials at least until the 1930s (Camfferman and Zeff, 1994: 136n). The main accounting journals also devoted considerable space to events in Britain. Even though attention was also paid to Germany, France and, increasingly so as the century progressed, to the US, British accountancy continued to attract the most attention (Camfferman, 1997: 74). By the 1930s, however, an important turning point was being reached. It was increasingly felt that Dutch auditing had matured to such a level that it no longer needed to take the role of student to the British teachers, and that, in fact, it was reaching for even higher levels.

The emergence of this notion was facilitated by the very limited role of the law in Dutch accounting and auditing in comparison with Britain. This created an opportunity to define the role of the auditor on a theoretical basis independent of legal constraints (cf. Flint, 1985: 36). That the opportunity was seized can be credited largely to Theodore Limperg.

In Britain, the involvement of the law in financial reporting and auditing had followed the growth of modern business as successive Companies Acts had attempted to accommodate changes in the functioning of limited liability companies. The audit and publication of balance sheets of public companies had been mandatory since the Companies Acts of 1900 and 1907, respectively. The 1928 Companies Act further extended these requirements by specifying particular items to be shown in the balance sheet and by requiring that a profit and loss account be made available to shareholders. Moreover, a body of jurisprudence had come into existence on issues relating to financial reporting and auditing. It may be true that 'accountancy writers could regard the judgments as, in the final analysis, of little significance' (Napier and Noke, 1992: 39); but the fact that the analysis had to be made at all, and the real possibility of the scrutiny of the auditor's work in court, were presumably important reasons why British auditors, in their professional training, placed considerable emphasis on the study of law (Napier, 1996: 452).

Even though by subsequent standards the influence of the law in British accounting of the 1920s may not have been extensive, in the Netherlands this influence was even more slight (see Camfferman, 1995; Zeff et al., 1992). Until 1928, the relevant legal requirements were contained in a Commercial Code that was in this respect virtually unchanged since 1838. For limited liability companies, there was no specification of the form in which an annual account had to be rendered to shareholders, no suggestion of general publicity nor any hint of an audit. Yet, during the 1880s and 1890s, it became common at least for listed companies to publish their balance sheets (and also quite frequently their profit and loss accounts), and a flourishing auditing profession came into being.

Perhaps surprisingly, from a British perspective, the courts did not provide any guidance during this stage. Although further research in this area would be desirable, it is probably correct to state that hardly any jurisprudence came into existence before the 1920s if not the 1930s that could provide useful guidance concerning the contents of financial statements or the work of the auditor. A main reason was probably that the statutory footholds for civil and criminal actions against auditors or directors with respect to financial statements were so narrowly defined that successful recourse to the courts was possible only in cases of blatant fraud or negligence, and not with a case based on technical niceties of accounting.[14]

When, in 1928, the Commercial Code was finally revised, the new reporting requirements by and large confirmed the well-established minimum practice of listed companies: the Code required publication of a balance sheet and profit and loss account, provided for a minimum of balance sheet disclosure and information about the valuation of assets, and gave the general meeting of shareholders the right to appoint an auditor. Because the law contained no new departures, it did not affect the position of Dutch auditors who had been used to look elsewhere for guidance in the development of their profession. In the earliest literature, this was commonly done by extensive discussions of foreign regulations (van Slooten, 1900; Volmer, 1914) from which a more or less informed choice was made to provide solutions for problems at hand. But it is Limperg's distinct contribution that he took a different road and managed to persuade a significant proportion of Dutch auditors of the correctness of his views.

Limperg's views on auditing (see Camfferman and Zeff, 1994) assumed that standards for the work of the auditor and the extent of his responsibility were not determined by convention or legal precedent, but by economic rationality. Particularly in the absence of a legally defined position, a long-term future for the auditing profession could be secured only when it defined a role for itself that was economically valuable to others. According to Limperg, such a role could not consist in checking the formal correspondence between the ledger and the financial statements. To a rational reader of financial statements, the audit would be valuable only if it assured him of the substantial correctness of the reported figures. To do so, the auditor had to go beyond the ledger, not merely to check the existence of assets at the balance sheet date, but more fundamentally to judge the correctness of the ending balance sheet figures by reconstructing the flows of money and goods in the course of the year from which the balance sheet position was the result.

Limperg's views, the essence of which was published as early as 1905, involved rather more audit work than traditional practices. They also shifted the focus away from the balance sheet audit towards the audit of the financial statements as an integrated whole. These views were very much Limperg's personal contribution to the Dutch auditing profession in which there was little or nothing that presaged the emergence of such views at that time. Because of this novelty, and presumably also because of the implication of more extensive audit work, Limperg's ideas were not accepted without opposition. But apart from mere conservatism, the nature of some of the opposition was a tribute to Limperg's influence. Because of his own theoretical work, and because of his practical contributions to the integration of the study of accountancy and economics at an academic level, the need for a proper theoretical foundation of auditing was quite widely acknowledged in the Dutch profession. Therefore, those who did not accept Limperg's views could accept that they had to be opposed on a theoretical level and could therefore give him full credit for raising the standard of reflection in the Dutch auditing profession to levels not reached abroad.[15]

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[14] See Volmer (1914: 108) on the Criminal Code clause on directors circulating an 'untrue' balance sheet: '[it] is a blunt weapon; the falsehood must be written all over [the balance sheet] if a conviction is to follow'. According to van Lier (1927) there was, in fact, no legal ground for criminal proceedings against auditors. With regard to civil law, Grosheide (1928) reported that he knew of only one case (in 1918) that had resulted in an auditor having to pay damages to his client for negligence in auditing. See also Knol (1936: 331) for a comment on the paucity of civil cases against directors.

As indicated by Edwards (1976), the contrast between Limperg's approach and contemporary British opinions on auditing (but also the opposition to Limperg's views in the Netherlands) are illustrated by the proceedings of the 1926 International Congress of Accountants, held in Amsterdam. At that Congress, both Limperg and Sir William Plender (who, as will be recalled, was to be one of the principal witnesses in the Royal Mail case), spoke on the subject of the responsibility of the auditor. Plender's paper was restricted almost entirely to a legal point of view, illustrating how in Britain (in the words of Edwards) 'the accountant became entirely preoccupied with his legal responsibilities which consequently determined the scope and extent of the audit'. Limperg, in contrast, left juridical concerns expressly out of his speech and attempted to base a theory of auditor responsibility on the premise of an economically rational audit function. In his own words, the contrast was expressed as:

> I am thinking more particularly about England, where, it seems to me, the ideas of the accountants about the problem discussed here, are not so much governed by rules derived from the exigencies of the profession as by judicial verdicts and the interpretation of the regulations laid down in the Companies Acts. (Limperg, 1926a: 85)

To Limperg, one of the most important practical consequences was that British auditors took a much too restricted view of their responsibility regarding the profit and loss account. Legally, British auditors had to report on the balance sheet only (a situation that was unaffected by the Companies Act 1928). Limperg strongly believed that British auditors typically restricted their audit to a verification of balance sheet positions, and saw the danger that in such a situation a release of secret reserves into income might be considered as outside the scope of the auditor's responsibility. This contrasted evidently with his own views and to some extent with Dutch practice in which, well before this was required by the Commercial Code reform of 1928 or even the literal sense of the Dutch Institute's own Rules of Professional Conduct, many auditors had accustomed themselves to auditing the balance sheet and the profit and loss account as a single document.[16]

At the 1926 Congress, Limperg's views did not come out to advantage. In his presentation, Plender put forward a rather more balanced image of British auditing than the legalistic picture sketched by Limperg. Not only did Plender claim important moral responsibilities for the British auditor, he also strongly took issue with the suggestion that British auditors were negligent with regard to the profit and loss account:

> The attachment of the auditor's report only to the Balance sheet did not mean that he had not examined the Profit- and Loss-account. The Balance sheet included the amount to the debit or credit of the Profit and Loss account, and the balance of that accountant [sic] needed and received just as close a verification as did any other figure on the Balance sheet. So important was this that if it showed a credit balance in excess of what the profit really was and a dividend was *improperly* [original emphasis] declared and paid out of that balance, the liquidator of the Company, should its circumstances lead to liquidation, might bring an action for breach of duty against directors and auditors....This was elemental to many present, and he only referred to it because some of their brethren from other countries might not quite have understood why the statutory report was fixed only to the Balance sheet of a limited liability company. (Plender, 1926: 109)

This rather clearly put Limperg in his place, and the audience did not hesitate to take a position. One of the Dutch debaters expressed his satisfaction that Plender's speech had confirmed his expectations that 'the interest of their English colleagues extended farther than the final figure of the profits appearing on the balance sheet' (p. 124). Another declared himself in sympathy with the British point of view as opposed to the 'extreme standpoint' taken by Limperg. When the discussion was reviewed in a 1929 Dutch textbook on auditing, the following conclusions were reached regarding to what was styled as the 'Plender-Limperg controversy':

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[15] E.g. Belle (1931: 5). See Flint (1985) and Munnik (1938: 214) for a retrospective and contemporary international comparison. See Napier (1996) for the absence of academic influence on accounting and auditing in Britain.

[16] It may be noted that the perceived difference was purely a matter of auditing principles, not one of financial reporting. Although Limperg was adamant that the profit and loss account be audited, he did not differ from his contemporaries in accepting the often highly condensed format of published profit and loss accounts. Grouping of amounts in single items was considered acceptable as long as the captions correctly indicated the mixed composition of such items. See Hogeweg (1926); Limperg (1926b).

> 1o. Currently held views [in the Netherlands] on the duty of the auditor of a limited liability company are generally more in conformity with the formulation of this duty in the paper of Plender than with the point of view of Professor Limperg.
> 2o. During the last decade, however, an evolution has been discernible in our country in the direction of a higher conception of the auditor's duty. (Nijst, 1929: 120)

4.3. Nature of response to the Royal Mail case

On the previous elements we can build an assessment of the nature of the first set of reactions to the Royal Mail case. As seen above, the case did not cause a break in the practice of secret reserve accounting. The existence of secret reserves, though questioned, remained a part of accepted practice.[17] At best, the case somewhat refined discussions on secret reserve accounting as it brought to the fore the issue of undisclosed releases which, prior to 1929, was not a regular element of such discussions.

The importance of the case in this period lies therefore not in its direct implications for secret reserve accounting, but in its implications for the more general process of reflection on the nature and course of the auditing profession. The case provided a vivid illustration of a number of propositions that Limperg and his followers had for a considerable time but with as yet incomplete success urged Dutch auditors to accept. These included the inadequacy of reliance on precedent in general and the acceptance of British auditing practice as normative in particular, the dangers of a strict legalism and, positively, the necessity of auditing the balance sheet and the profit and loss account as an integrated whole.

We do not know about Limperg's private reaction to the case. However, one cannot help but wonder about his feelings when he learned that his former opponent, Plender, was forced to argue that his confident words at the 1926 Congress about the obvious legal responsibility of the auditor for disclosure of releases from secret reserves, did not apply to the case in which he appeared as a *de facto* witness for the defence.[18] But, thanks to the Royal Mail case, the argument that British auditors had a legalistic and restricted view of their responsibilities resurfaced in the Dutch literature. It may be recalled that Hageman, quoted at length at the start of this section, pointed to this issue in explaining the significance of the Royal Mail case. Another auditor who considered himself part of Limperg's school, van Rietschoten, commented negatively on the legal advice received and published by the Council of the English Institute on the implications of the Royal Mail case. First, the legal counsel was cited as follows:

> In our opinion, having regard to the fact that the balance sheet contains as one of its items the balance brought in from the profit and loss account, [the auditors] *cannot dissociate themselves from all responsibility* [emphasis added by van Rietschoten] for the correctness of that account and there may be cases in which it would be incumbent upon them to draw the attention of shareholders to any feature of that account which in their view involved anything of an improper and misleading character.[19]

This elicited the following comment by van Rietschoten:

> This statement once again clearly demonstrates the necessity that the English auditor's opinion no longer be confined to the balance sheet, but is also extended to the profit and loss account. The reasoning quoted here is really so useless that probably no-one will have read it with satisfaction. (van Rietschoten, 1932).[20]

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[17] Not in the least because in the preparation of the Commercial Code revision the Justice Ministry had explicitly indicated that it did not object to undisclosed reserves provided that their existence could be inferred from a careful reading of the financial statements. See also van der Heijden (1929: 359).

[18] If Dutch contemporaries did at all link Plender's appearance in the Royal Mail trial with his utterances at the 1926 Congress, this did not affect his subsequent stature in the Netherlands. Plender had quite a reputation among Dutch auditors and with his peerage (conferred in 1931) and his country estate was a perfect symbol of the difference in social standing between British and Dutch auditors, of which the latter were keenly aware (Anonymous, 1933; van Dien, 1930). In a 1933 discussion meeting, someone suggested that a Dutch auditor in charge of the audit of a holding company could not conceivably be so insolent as to send a working programme for the audit of a subsidiary to 'Lord Plender of Price, Waterhouse & Co'. Another argued that this was quite possible, provided that the British auditor was treated with due respect (at the meeting, no one observed that Plender was mentioned in connection with the wrong firm) (see Polak, 1933).

[19] Van Rietschoten cited the counsel's opinion in Dutch. The text cited here is the original English in 'The Institute of Chartered Accountants and the Royal Mail case—Counsel's opinion', *The Accountant*, 85 no. 2976, 19 December 1931: 804–805, with van Rietschoten's italics added.

[20] van Rietschoten's reaction may have been coloured by his apparent belief that he was citing the Institute's Council rather than the opinion of counsel.

Following the Royal Mail case, Limperg himself also confidently repeated his perception of British auditing, even though this had been declared invalid at the 1926 Congress. When British professional journals commented unfavourably on the wording of the (Dutch) auditor's report on the annual reports of the Philips company, Limperg retorted:

> It is known to all serious students, and it has repeatedly become publicly known, that the English auditor generally restricts his task far more [than the Dutch auditor]; and that he often restricts it too much by certifying only the balance sheet and not the profit and loss account, and by relying in numerous parts of the audit on the opinion of the auditee and his employees (Limperg, 1935).

Seen in this way, the Royal Mail case provided Limperg and his adherents with support in what was, in effect, an ongoing battle over standards of auditing in the Netherlands. But the Royal Mail case did not start this battle, nor is there any reason to attribute it an inordinately heavy weight in settling the issue in Limperg's favour. But that it was settled in his favour shortly afterwards is beyond doubt. According to a recent history of the NIVA, 'in the years between 1935 and 1946, the last resistance within the NIVA against Limperg's approach was broken'. Among other things, this meant that the NIVA's code of conduct henceforth formally prohibited the audit of two successive balance sheets without an audit of the profit and loss account over the intervening period (see de Vries, 1985: 171). This feature could be cited to show how auditing in the Netherlands had reached a higher plane than in Britain (see Limperg, 1965: 129 and Tempelaar, 1952b). In general, the process of emancipation from British leadership was completed, following which 'in large sections of the Institute the opinion prevailed that no one could match the Dutch profession with its theoretical foundation according to Limperg' (de Hen et al., 1995: 18).

5. Subsequent reactions 1946–1950

As related in Section 2, the effects of the Royal Mail case in Britain had not worked themselves out by the mid-1930s but continued to be felt until well into the 1940s. Although initial British reactions to the case may have been 'ineffective and muddled' (Napier, 1995), by the time of the Companies Act 1947 there was no mistaking the extent of the changes that had been brought about. In the Netherlands, the preparations leading up to the Companies Act, and the provisions of the Act themselves, were a sufficient stimulus to recall the Royal Mail case, and to question whether the reaction of the Dutch auditing profession to that event was still adequate. At this stage, the focus of attention shifted away from the issue of the auditor's responsibility towards the acceptability of secret reserve accounting.

This distinction between the auditing and financial reporting aspects of the Royal Mail case helps to understand the different evaluation of events in Britain which forms a recurring theme in the post-war Dutch literature. Those who focused on auditing issues would see the Cohen Committee's report and the Companies Act 1947 as attempts to catch up with the more advanced Dutch standards. Those who focused on reporting standards, and in particular on secret reserves, would see the same events as signs of a new departure in which the Netherlands risked falling behind.

The comfortable pre-war position that the lessons of the Royal Mail case were primarily applicable to Britain itself is represented by the auditors Porrey (1950) and Stokvis (1950), who linked the Companies Act with the implications of the Royal Mail case in terms of the auditor's responsibility for the profit and loss account. Both concluded that, as a result of the lessons drawn from the case and their codification in the Companies Act, British auditing standards had much improved. Stokvis argued, however, on the basis of a review of the British literature since the Royal Mail case, that there was still room for further improvement. He believed that, since the London Congress of 1933, British auditors were less inclined to define their responsibility in purely legal terms, and that there was a growing attention for the audit of the profit and loss account. Yet, he concluded, 'these important events [the Companies Act 1929 and the Royal Mail case] have not, in my opinion, had the result that in England the importance and the audit of the profit and loss account are seen in the same way as in this country' (p. 17).

The alarmist position, on the other hand, was taken by G.K.H. Hinnen. He was originally not a NIVA member, but had joined when two smaller organisations of auditors merged with the NIVA in 1935. As a representative of his organisation, he had attended the 1933 London Congress himself, including the presentation of Henri Morgan's paper, fraught with references to the Royal Mail case. In the discussion of that paper, Hinnen had clearly stated his beliefs that 'a balance sheet that contains secret reserves does not show a true and correct view of the state of the company's affairs' (Morgan, 1933: 579).

Following the merger of 1935, Hinnen became a member of the key NIVA committee charged with revising the NIVA's Rules of Professional Conduct. It may be noted that this revision was an important part in the movement to enshrine Limperg's views on auditing as the dominant outlook of the Dutch auditing profession. Limperg, who was chairman of the committee, also saw the work of the committee as a further move ahead of the British example.[21]

In the course of their activities, the committee members came across the issue of secret reserves and, from the moment the issue was raised, Hinnen consistently put forward his opinion that both the existence and the release of secret reserves into income had at least to be indicated in the financial statements. On this issue he found all the other members against him; they argued that the abuse rather than the use of secret reserves had to be halted, and that the auditor's responsibility as defined in the new Rules was the proper safeguard.[22] In its final report, published in 1939, the committee stated that they were aware of the dangers attached to secret reserves, but that they considered a prohibition to be 'too great a hindrance to sound business life'. Revealing the existence of secret reserves was not, in their opinion, a prerequisite for obtaining an unqualified report. Yet, the committee was obliged to report Hinnen's opposition as a minority view (NIVA, 1946: 54).

After the interruption of the Second World War, discussions on the committee's report continued and in 1946, Hinnen repeated his objections to secret reserves in a strongly worded speech at a membership meeting. He deplored the lack of critical views on secret reserves in the Dutch literature, and he referred his audience to Morgan's 1933 paper and its discussion of the Royal Mail case. He presented the Cohen Committee's report as a recent consequence of the case and observed that 'while in England measures will probably be taken against secret reserves, we will be setting our clocks backwards.' He warned: 'I am convinced that in this way we will presently have our own Royal Mail affair' (NIVA, 1946: 66–7). Limperg expressed his sympathy with Hinnen's intentions, but made it clear that for the time being it was not up to the auditor to prevent *bona fide* companies from forming secret reserves. As to the reference to England, Limperg observed:

> Even though England has been shaken by the serious case of the Royal Mail, in which secret reserves were used to pay dividends in years of adversity, we must not let ourselves be intimidated by that case. We are further ahead in our convictions regarding the conscientious practice of our profession than in England. If such a case should occur, the Dutch auditor would certainly not, according to these proposed Rules, be exonerated. (NIVA, 1946: 93)

In the end, Hinnen's objections to the new Rules' treatment of secret reserves did not prevail. Hinnen, however, pledged to 'personally continue the battle against secret reserves', which he did with a subsequent publication (Hinnen, 1948a) in which he argued that the tide of history, as far as secret reserves were concerned, was moving from the Royal Mail case to the Cohen Committee's report and the Companies Act, and that the Dutch profession would do well to adjust itself to it.

Support for Hinnen's assertion that the Royal Mail case held lessons for the Dutch with regard to secret reserve accounting came from J.E. Spinosa Cattela, a former internal auditor of Philips who had, by living and working abroad for a number of years, obtained first-hand experience of financial reporting practices in a number of English-speaking countries. In 1948, he published an introductory auditing text book for the Dutch market which devoted no fewer than six pages to the Royal Mail case in its discussion of secret reserves. Included in this section were several long questions from Mr Justice Wright's famous address to the jury (Spinosa Cattela, 1948: 113–8). From this and many other references to the British and American literature, it is evident that the author, who also acknowledged the value of the specifically Dutch contributions to auditing made by Limperg and others, wanted to impress his readers with the relevance of foreign contributions in the area of financial reporting.

A somewhat similar judgment came from Ch. Hageman. While in his 1932 review (see above), he had concluded that the lessons from the Royal Mail case were already discounted in Dutch practice, he wrote in 1946 on the Cohen Committee's proposals regarding secret reserves, and gave his impression that 'a new direction is taken in the publication of English annual reports' (Hageman, 1946: 254). The next year he reviewed an article on 'accounting principles' in *The Accountant* and commented:

> The battle on secret reserves came into an interim phase because of the Royal Mail Case. Lord Plender then gave his opinion that the release of secret reserves had to be disclosed....now we have come to the principle that both the creation and the use of secret reserves must be made public...On reading the above, the thought suggests itself that the backwardness of 'accounting principles' in Great Britain has largely disappeared and changed itself into a lead regarding the publication of financial statements, especially with respect to secret reserves. (Hageman, 1947: 97–8)

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[21] During one of the committee's first meetings, Limperg argued that the absence of similar Rules of Professional Conduct in Britain 'has as a consequence that developments there have come to a halt. Over there, appeals to jurisprudence are made and it is so much more difficult to change that.' (Minutes of meeting 4 July 1931, p. 4)

[22] Minutes of 21 March 1936, 11 July 1936, 23 April 1938 and 9 July 1938.

In addition, other positive assessments of the Cohen Committee's report and the Companies Act 1947 (e.g. ten Bosch, 1948; Valkhoff, 1946) showed that innovations in British financial reporting regulation were seen as highly significant.

Of course, there were more critical voices as well. Hinnen's (1948a) article provoked a public discussion with R.A. Dijker, a senior member of the Dutch profession (but not a Limperg adherent by any standard). Dijker argued that the Royal Mail case represented just a more extreme form of abuse that could not be used to argue against the use of secret reserves in general (Dijker, 1948a). Similarly, it was observed in a review of Spinosa Cattela's textbook that 'the foreign jurisprudence reported in later chapters might, in my opinion, have been discussed less extensively (for example the Royal Mail case)' (Hogeweg, 1948: 350).[23] The extensive discussion of the Royal Mail case was retained in the second (1952) edition of the textbook, however.

What we can conclude from this brief review is that in the post-war years, the Royal Mail case, reinforced by the Companies Act 1947, made a reappearance in the consciousness of Dutch auditors, this time in connection with the issue of secret reserve accounting for which it is best known. The relevance of the case to Dutch circumstances was, however, disputed. The most dire prediction, that the Netherlands would soon have its own Royal Mail case, was not vindicated, and perhaps partly for that reason, the issue of secret reserve accounting would not be settled definitively until the introduction of new legal reporting regulation in 1970.

While secret reserves continued to exercise the minds of auditors, the post-1950 literature on the issue would, with few exceptions (Foppe, 1955; Tempelaar, 1952a) no longer refer to the Royal Mail case. The most obvious reason for this is that by the early 1950s the case had become an occurrence of some 20 years past, and that new, domestic points of reference had become available.[24]

6. Concluding remarks

By documenting Dutch reactions to the Royal Mail case, this paper has shown that this landmark event in the history of British accountancy did not go unnoticed in the Netherlands. Moreover, the nature of the reactions to the case allows some inferences to be drawn regarding the connections between the history of financial reporting and auditing in the two countries.

The case illustrates that Dutch auditors were reasonably aware of British affairs. Moreover, they were capable of interpreting these events correctly in the sense that the case was cited in connection with the same main issues that the case had raised in Britain: secret reserves and the nature and extent of the auditor's responsibility.

Moreover, it has been shown that a number of individuals throughout the period were quite active in consciously positioning Dutch accountancy relative to its counterpart in Britain. They could differ in their assessments as to whether the Netherlands was ahead or behind Britain, but by agreeing on Britain as a relevant benchmark they ensured that Dutch accountancy did not develop in isolation.

With regard to the Royal Mail case itself, it has been shown how its direct effect in the Netherlands was fairly small. Apart from the fact that even in Britain a common perception of the Royal Mail case emerged only after a number of years, this was caused by the impression of a substantial group of Dutch auditors, led by Limperg, that the case was not a signal that change was required in the Netherlands. Rather, the case confirmed their views on a number of issues regarding auditor responsibility, such as the imperative of considering extra-legal responsibilities and the necessity of auditing the profit and loss account. On these issues, it was believed, the Netherlands was ahead of Britain.

It is beyond the scope of this paper to determine to what extent this belief was shared and reflected in practice. At the time, there was certainly considerable opposition to Limperg's views and it would be rash to conclude that practices like those of the Royal Mail Company did not occur in the Netherlands simply because Limperg insisted that the auditor should take responsibility for the correctness of the income statement.

Indirectly, through the Companies Act 1947, the Royal Mail case exerted some influence on Dutch accounting. The provisions of the Act brought the issue of secret reserves to the attention of Dutch auditors and reawakened memories of the case. But by that time, the notion of the superiority of Dutch auditing standards (to which the Royal Mail case had arguably contributed) was so well established that the auditing profession proceeded to solve that issue in the following years on the basis of purely domestic arguments.

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[23] See also the critical review by Dijker, who criticised the author for being too much under the influence of 'the older English literature' (Dijker, 1948b).

[24] This can be seen in the preparations of a NIVA discussion memorandum on secret reserve accounting and the role of the auditor. The committee charged with preparing the memorandum was installed in 1953. In the initial discussions, favourable references to Britain, in particular the Companies Act, were quite prominent (the Royal Mail case made but one fleeting appearance in the committee's files). After 1955, a set of recommendations on financial reporting issued by the Dutch employer's associations (Zeff et al., 1992: 94–114) became the main point of reference and in the final committee report (NIVA, 1962), no references to Britain or indeed any foreign country were included. See files of the Bos Subcommittee (NIVA-archives file 776), in particular nos 26, 123, 205–206, 235–236).

The limitations of this paper, its simplifying focus on a single event and its almost exclusive reliance on utterances by the limited group of Dutch auditors whose opinions were recorded in print, are apparent. Further research, based on a direct comparison of actual reporting practices or focusing on the contents of professional education is therefore appropriate if we want to increase our understanding of how, even without conscious British effort, knowledge of British accounting and auditing helped to shape continental European practices and standards.

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The accuracy of earnings forecasts in IPO prospectuses on the Kuala Lumpur Stock Exchange

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Abstract—This paper examines the accuracy of earnings forecasts made by managers of Malaysian initial public offerings (IPOs) during the period 1984–1995. It is a mandatory requirement for Malaysian IPOs to furnish earnings forecasts together with the opinions thereon of the auditors and the lead underwriter in their prospectuses. Their accuracy is measured by forecast errors, absolute forecast errors, squared forecast errors and standardised forecast errors. The results suggest that, on average, managers under-forecast earnings by 33.37%. A comparison with the naive no change model in earnings suggests that 96 out of 122 companies outperform this model. A number of company specific characteristics (size, age, forecast interval, gearing, proportion of shares retained by owners, auditor reputation and industry) are tested. The results reveal that both the age and industry classification of the company are statistically significant, and that management earnings forecasts are particularly inaccurate where firms experience a decline in earnings. Key words: accuracy of prospectus earnings forecasts, initial public offerings, accounting in Malaysia.

1. Introduction

Prior research on earnings forecasts published by companies suggests that these forecasts have predictive content with respect to actual earnings (Ruland, 1978; Waymire, 1986; Hassell and Jennings, 1986; and McNichols, 1989). Other studies have found an association between the disclosure of earnings forecasts made by company management and changes in market expectations, as reflected either by changes in share prices or in revisions of earning forecasts by investment analysts (Patell, 1976; Penman, 1980; Baginski et al., 1993; and Pownall et al., 1993).

The primary objective of this study is to examine the accuracy of earnings forecasts included in the prospectuses of Malaysian companies seeking listing on the Kuala Lumpur Stock Exchange (KLSE) main board. We also examine possible factors responsible for the variation in the level of accuracy of earnings forecasts. The justification for this study stems from the fact that there is a paucity of research on earnings forecasts in emerging markets. Furthermore, the Malaysian market provides a rare test case in that companies seeking listing are required to provide earnings forecasts for their next financial year end.

Studies of the accuracy of earnings forecasts made by management in IPO prospectuses are relatively limited. This could be due to the fact that in some countries quantitative earnings forecasts are not included in the prospectuses.[1] In addition, in some countries the management may entail risks that could be costly.[2] These costs may include litigation costs arising from inaccurate forecasts as well as 'reputation' costs if management is subsequently viewed as unreliable. The research in this area is mainly restricted to British Commonwealth countries: Hong Kong, Malaysia, New Zealand, Canada, Singapore, Australia and the UK.

Table 1 summarises the results of earlier studies on the bias of a forecast and the accuracy of earnings forecasts in IPO prospectuses. The bias is normally measured by signed forecast error, defined as a difference between forecast and actual profits scaled by forecast profits (forecast error). A posi-

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[1] Forecast data were prohibited in prospectuses to the general public by Securities and Exchange Commission in the US prior to 1973, Firth et al. (1995).

[2] For more on legal issues in US and Canada see Bartley and Cameron (1991), and Clarkson et al. (1992).

Table 1
Summary of studies on accuracy of earnings forecasts in IPOs prospectuses

Study	*Country*	*Period*	*Sample*	*FE (%)*	*AFE (%)*	*FE Range (%)*	*Companies within range (%)*
Dev and Web (1972)	UK	1968—69	212	+112	—	+46.6 to 196.4	—
Keasey and McGuinness (1991)	UK	1984—86	121	+5	11	—	—
Firth and Smith (1992)	NZ	1983—86	89	−92	328	+3047 to −12393	19[b]
Mak (1989)	NZ	1983—87	71	—	100	—	—
Mohamad et al. (1994)	MY	1975—88	65	+9.34	27.91	+219.97 to −232.05	47.7[c]
Selva et al. (1994)	HK	1986—92	72	−14.12	—	+68.67 to −245.79	—
Chan et al. (1996)	HK	1990—92	110	—	18	—	60[d]
Pedwell et al. (1994)	Canada	1983—87	112	−77.7	88	+101.3 to −3958.5	55[b]
Clarkson et al. (1989)	Canada	1984—87	93	+99	—	+3959 to −n.a.	41[c]
Tan (1987)	Singapore	1972—84	51	+24	—	—	33[c]
Firth et al. (1995)	Singapore	1980—93	104	+20.11	10.4	—	60[e]

Notes:

a. Results reported in Table 1, except Dev and Webb, Clarkson et al., and Tan, are based on the following error metrics: $FE = [(AjT - FjT)/FjT] \times 100$: $AFE = [|AjT - FjT|/|FjT|] \times 100$. In Dev and Webb the forecast error based on the ratio between the reported and forecast profits before corporation tax. Forecast error in Clarkson et al. is calculated as $FE = [(FjT - AjT)/FjT] \times 100$. Forcast error in Tan is calculated as $FE = [(FjT - AjT)/AjT] \times 100$

b. within ± 20%

c. Within ± 10%

d. Within ± 8%

e. Within ± 15%

tive forecast error indicates that forecast profit exceeds actual profit. Absolute errors (forecast error in absolute form) measure the forecast accuracy.[3] Selva et al. (1994) and Chan et al. (1996) report a forecast error and an absolute forecast error on the Hong Kong market of −14.12% and 18% respectively. The Selva et al. (1994) results show that the forecast error is significantly related to the forecast horizon at the 1% level. However, no relationship is found between the forecast error, industry classification, change in GDP, and the proportion of shares retained by the management. In contrast, the Chan et al. (1996) results reveal that the accuracy of earnings forecasts is related to the volatility of past profits, the change in economic conditions, and the year of the IPO.

Firth and Smith (1992), and Mak (1989) examine the disclosure of earnings forecasts in prospectuses of New Zealand IPOs. The former report a large and negative mean forecast error of −92% and an unexpected statistically significant negative relationship, is also found between company size and forecast accuracy. However, the results do not reveal any significant relationship between forecast accuracy, firm specific characteristics (age, gearing, auditors' reputation, forecast horizon), and the initial share premium. Mak (1989) reports an absolute forecast error of 100%. The results show a statistically significant relationship between the forecast horizon and the forecast error, but only a weak relationship between industry classification and the forecast error.

Mohamad et al. (1994) examine the forecast accuracy of 65 Malaysian IPOs over the period 1975–1988. Their results show a mean forecast error of 9.34%, suggesting that, on average, managers underestimate future earnings. They also examine the relationship between the forecast error and a number of possible explanatory variables (forecast horizon, company's size and age, auditors' reputation, and gearing) and the relationship between the initial premium and the forecast error. The results reveal that only gearing is statistically significantly related to the forecast error, and no significant relationship is found between the initial premium and the forecast error.

Dev and Webb (1972), Ferris and Hayes (1977), and Keasey and McGuinness (1991) examine the accuracy of earnings forecasts included on a voluntary basis in IPO prospectuses in the UK market. Their findings reveal a positive bias in that management generally underestimates future earnings. Dev and Webb report a significant positive relationship between the forecast horizon and the forecast error, and some, but not statistically significant, relationship attributable to industrial classification. Ferris and Hayes reported a negative relationship between companies' size and forecast accuracy, and a positive correlation between forecast accuracy and forecasting horizon.

In the next section we discuss the institutional aspects of IPOs in Malaysia. The sample selection process, data sources, and the methodology used to measure forecast errors is discussed in section three. The results of the descriptive statistics and an analysis of forecast error patterns, together with comparisons with the naive no-change model, are presented in section four. In section five, an empirical model to identify the factors responsible for the accuracy of earnings forecasts is developed and tested and the results discussed. The final section presents the conclusions and suggests some areas for further research.

2. Malaysian new issues market

The substantial growth in the total market capitalisation of the KLSE from a mere US$5.5bn in 1973 to almost US$200bn in 1994, can to a large extent be explained by the successful economic policies of the Malaysian government during that period. Between 1971 and 1980 the country's real gross domestic product (GDP) grew by an average of 8.3% per annum and over 1981–1994 by an average rate of 6.7%, while the seventh five-year plan envisages a rise of 8% per annum between 1996 and 2000.[4]

Another major contributing factor is the successful privatisation programme which began in 1983 with the sale of Malaysian Television System on the basis of buy and operate and the flotation of Cement Industries of Malaysia on the KLSE in 1984. More than 60 companies have been privatised over the last 12 years and 18 of these companies are listed on the KLSE.[5] The KLSE also experienced a strong growth in new issues of private companies. During 1990–1995 more than 200 IPOs were listed on both the main and the second board of the KLSE, compared with a total of 77 IPOs during the 1980s.

The IPO market in Malaysia differs from other such markets in a number of ways, the most important of which is that IPOs are an instrument of the official government policy for redistribution of the national wealth among different ethnic groups.[6] Consequently, IPOs are strictly regulated and monitored by the government, which involves a lengthy process before approval is granted for official listing on the KLSE. Apart from the Securities Commission (SC), the other institutions involved are the Ministry of International Trade (MITI), the Foreign Investment Committee (FIC), Malaysian Industrial Development Finance Consultancy and Corporate Services, and the Anti-Corruption Agency. Before approval is granted, the SC makes a financial and qualitative evaluation of the firm, taking into account the profits and dividends forecasts by the firm and its underwriter.

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[3] Results reported in Table 1, except Dev and Webb (1972), Clarkson et al., and Tan (1987), are based on the following error metrics: $FE = [(AjT - FjT)/FjT] \times 100$; $AFE = [|AjT - FjT|/|FjT|] \times 100$. In Dev and Webb the forecast error is based on the ratio between the reported and forecast profits before corporation tax. Forecast error in Clarkson et al. is calculated as $FE = [(FjT - AjT)/FjT] \times 100$. Forecast error in Tan is calculated as $FE = [(FjT - AjT)/FjT] \times 100$.

[4] It is worthwhile to point out that this forecast is now very doubtful given the recent substantial decline in the value of both the Malaysian ringgit and stock prices; *Financial Times.* 'Malaysia charts course for technology age', 7 May 1996.

[5] Prior to the privatisation programme, state-controlled companies accounted for about 40% of the capitalisation of the Kuala Lumpur stock exchange; *Financial Times,* 'Malaysian privatization loses allure', 13 October 1995.

Subsequent to the approval of the SC, and before the signing of the underwriting agreement and the announcement of the offer price, the board of directors and its lead underwriter are required to furnish a detailed prospectus to the SC and the KLSE. The prospectus must include, among other things, details of the previous five years' profit and of the financial position and liquidity, qualitative information about the company and its management (e.g. scope for diversification, the business and financial risk of the company, quality of the management, etc.), the intended use of proceeds from the issue, the forecast of next year's gross earnings per share and gross dividends per share, excluding any extraordinary items, and the key assumptions on which these forecasts are based. It is recommended by the SC that future profits should reflect an increasing trend.

According to the recent revised regulation, which took effect from January 1996, both the major shareholders and the promoting bank (usually the lead underwriter) in the case of companies involved in construction, services, and specialised industries have to provide a guarantee[7] that the company will achieve not less than 90% of the profits as forecast in the prospectus, and also not less than 90% of the forecast maintainable profits for the next two years following the official listing. Alternatively they must agree not to sell or transfer any of their shareholdings in the company within the first 12 months of listing. Thereafter, the major shareholders can reduce their stake in the company by a maximum of 20% per annum on a straight-line basis.

3. Data and methodology

The paper examines the accuracy of earnings forecasts contained in prospectuses of companies seeking listing on the KLSE main board over the period January 1984 to September 1995. During this period there were no significant changes in regulation with regard to the offer of securities.[8] The initial population was 173 IPOs. Companies with forecasts made on a limit basis or as a range, as well as forecasts for which matching actual earnings figures were not available, are excluded from the analysis. The final sample comprises 124 companies for which forecasts are stated as a single figure forecast (e.g. profit will be 20m Malaysian Ringgits). Of the 124 IPOs, 15 are privatised companies and 109 are private sector IPOs and they come from the following industries: manufacturing (47), services (61), construction (10), and special industries (6).[9]

The sample is extracted from the *Investors Digest* and the databank of the research department of the KLSE. Data for earnings forecasts, forecast horizon, average turnover over three years prior to listing, proportion of shares retained by the owners, company age, and auditor were collected from the prospectuses. Data for actual profits for the financial year following official listing, total assets, gearing ratio, and industry classification were mainly extracted from the PACAP database and various issues of the *KLSE Annual Companies Handbook*. End of year market values are extracted from Datastream's database.

Earnings forecasts are made for the current financial year. However, where the end of the financial year is within three months from the date of submission, the forecasts must be made for the current and the next immediate financial year.[10] Companies for which reported actual earnings and earnings forecasts are made on a different accounting basis could give rise to problems with the measurement of forecast accuracy and also with the interpretation of the results (Dev and Webb, 1972). To overcome these problems we first compare the forecast and reported profits on a before tax basis to eliminate the possibility of any differences caused, for example, by changes in the tax rate. Then the annual accounts of the sample firms are examined to ensure that forecast profits are compared with reported actual profits on the same basis. For example, if the profit forecast is after minority interest and before extraordinary items, then the actual profit is also taken on this basis.

Data on earnings forecasts made by the management of IPOs is significantly different from data on earnings forecasts made by security analysts. For example, management releases only one forecast whereas analysts publish revisions of their forecasts throughout the year. In addition, management forecasts are released only in special circumstances, such as IPOs, whereas security analysts' forecasts are typically available for a broad cross-section of firms.[11] Consequently, not all models employed in studies of the accuracy of analysts forecasts of earnings are suitable for a study of earnings forecasts made by management.[12] The models applied in this study are based upon percentage errors and comprise: (a) forecast error, (b) the absolute forecast error, (c) the squared forecast error. These forecast errors are estimated as shown below:

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[6] The government's aim was to increase Malays' ownership in the corporate sector by allowing them to acquire a higher percentage of newly issued shares than other ethnic groups.

[7] The guarantee could be either in the form of a bank guarantee or the placement of shares by the major shareholders with an independent third party.

[8] Listing requirements and procedures for initial listing application are given in the Companies Act (1965) and Securities Industry Act (1983). The requirements and procedures were updated by the Policies and Guidelines on Issue/Offer of Securities from 1995 with effect from January 1996.

[9] 'Services' consists of trading, finance, properties and hotels. 'Special industries' includes plantations, mining and trusts.

[10] From January 1996 the minimum forecast horizon has been six months.

$$FE=\left[\frac{(A_{j,T}-F_{j,T})}{F_{j,T}}\right]\times 100 \tag{1}$$

$$AFE=\left|\frac{A_{j,T}-F_{j,T}}{F_{j,T}}\right|\times 100 \tag{2}$$

$$SQFE=\left(\frac{A_{j,T}-F_{j,T}}{F_{j,T}}\right)^2\times 100 \tag{3}$$

where

FE = Forecast error

$A_{j,T}$ = Actual earnings of firm j for period T

$F_{j,T}$ = Forecast earnings of firm j for period T

AFE = Absolute forecast error

SQFE = Squared forecast error

If the forecasts are unbiased (that is, company management do not systematically over or under predict earnings), the mean of the forecast errors (FE) should not be significantly different from zero. The mean absolute forecast error (AFE) provides an indication of how close the forecasts were to actual profits in absolute terms. It is, therefore, an important indicator of forecast accuracy. Finally, the squared forecast error (SQFE) gives more weight to large errors, and it is more appropriate for an analysis of investors' losses due to forecast inaccuracy (Bhaskar and Morris, 1984).

In order to examine the patterns in forecast errors we construct the prediction realisation diagram (PRD). Forecast changes in earnings, defined in (5), are plotted along the vertical axis while actual changes in earnings, defined in (6), are plotted along horizontal axis. Perfect forecasts ($\Delta F_{j,T}-\Delta A_{j,T} = 0$) would be plotted along the line that lies at a 45° angle to the horizontal axis. The lines form six different sections, each representing a different pattern in forecast errors.

$$\Delta F_{j,T}=F_{j,T}-PA_{j,T} \tag{4}$$

$$\Delta A_{j,T}=A_{j,T}-PA_{j,T} \tag{5}$$

where

$\Delta F_{j,T}$ = Forecast change in earnings for firm j for period T

$\Delta A_{j,T}$ = Actual change in earnings for firm j for period T

$PA_{j,T}$ = Prior actual earnings for firm j at the time the forecast is made

$A_{j,T}$ = Actual earnings of firm j for period T

$F_{j,T}$ = Forecast earnings of firm j for period T

Optimistic forecasts are found in sections 1, 2, and 5, (to the left of 45° angle line) while pessimistic forecasts are found in sections 3, 4, and 6 (to the right of 45° angle line). A point lying in section 1 of the PRD suggests that managers successfully forecast an increase in earnings, but overestimated the size of earnings, while those in section 2 imply that managers correctly predicted a decrease in earnings but underestimated the size of the decrease. For points in section 5 managers predicted that earnings would increase when they actually decreased. Sections 3, 4 and 6 are mirror images of sections 1, 2 and 5. This means that sections 3 and 4 indicate that managers were successful in forecasting an increase and a decrease in earnings respectively, but were pessimistic about the change in the size of future earnings. Finally, in the case of points in section 6, managers forecast a decrease in earnings when they actually increased.

The results of studies which compare the accuracy of mechanical forecast models and management's forecasts provide some evidence as to whether statistical forecast models can be surrogates for management forecasts. Empirical evidence suggests that relatively simple models for forecasting earnings such as the naive no-change model and submartingale seem to be less accurate than management forecasts (Cameron, 1982). However, results for more complex models such as the Box Jenkins model are not conclusive (Imhoff and Pare, 1982; Hagerman and Ruland, 1979).[13]

In this study, earnings forecasts included in prospectuses of IPOs are compared with a simple naive no change in earnings model utilising Theil's Inequality Coefficient. The TIC is based on the difference between forecast and actual change in earnings and is calculated as follows.[14]

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[11] For more on differences between forecasts made by management and forecasts made by analysts, see Brown et al. (1985).

[12] For a discussion of alternative measures of forecast accuracy, see Bartley and Cameron (1991).

[13] The results are even more difficult to interpret because of differences in terms of the time period left in the financial year to forecast, the error measures used, and the mechanical models used as a benchmark (Brown et al. 1985).

[14] Theil (1966); as cited in Elton and Gruber (1995: 674–678).

$$TIC = \frac{\sum (\Delta F_{j,T} - \Delta A_{j,T})^2}{\sum (\Delta A_{j,T})^2} \qquad (6)$$

where

TIC = Theil's Inequality Coefficient

$\Delta F_{j,T}$ = Forecast change in earnings for firm j for period T

$\Delta A_{j,T}$ = Actual change in earnings for firm j for period T

The TIC has a simple economic interpretation which enables a comparison with the naive no-change model to be made. A zero TIC value indicates a perfect forecast, while when the forecast change in earnings ($\Delta F_{j,T}$) equals zero (i.e. a forecast of no change in earnings), TIC is equal to 1. Thus, a TIC value of 1 implies a forecast made according to the naive no-change model. Values less than one imply managers' ability to outperform the model, while those greater than one imply their failure to outperform the naive no-change model.

4. Patterns of forecast errors and comparison with the naive no-change model

Table 2 sets out the results of the analysis of the three different forecast errors. The findings reveal that the mean forecast error made by management is positive and outside the ± 10 percent range tolerated by the Securities Commission. Out of the 124 companies in the sample, 71 companies exceeded their profit forecast while 53 reported earnings below those predicted in the prospectus. The mean forecast error is +33.37%, indicating underforecasts. We test the hypothesis that the Mean FE is equal to zero vs. Mean is not equal to zero using a t-test. The reported t-values in Table 2 suggest that the mean FE is not significantly different from zero. However, the mean of AFE is significantly different from zero at 5% level.

As the distribution of error metrics are not symmetric (skewed to the right), the t-statistic must be interpreted with caution. Using non-parametric tests for the median, the FE is also not significantly different from zero. However, the medians of AFE and SQFE are significantly different from zero at the 1% level.

As in most other papers on earnings forecasts, outliers appear in the data set. It is a common practice in the literature to truncate the data so that any observed forecast error exceeding a certain percentage is removed from the sample. Such abnormal cases may be due to data error or to transitory factors within the companies. Mechmar Bestobell Berhad and Worldwide Holdings Berhad are two outliers with forecast errors of +4110.53 and −136.17% respectively. In the case of Mechmar Bestobell Berhad, the extreme forecast error was due to both restructuring and a merger occurring within the same year of official listing. In the case of Worldwide Holdings Berhad, it embarked on a restructuring exercise just before the submission for listing. These companies are removed from the sample before examining the hypotheses.

After the exclusion of the two outliers, the mean forecast error is +1.34%, while the relatively large mean absolute forecast error of +54.91% fell to +21%. The means of AFE and SQFE are significantly different from zero at the 1% significance level. The results for non-parametric tests also reveal that both the median of the AFE and the median of the SQFE are significantly different from zero at 1% level.

Elton and Gruber (1995) and Patz (1989) point out that percentage errors may be distorted by small earnings amounts in the denominator.[15] In order to overcome this problem we followed the method suggested by Firth and Smith (1992), and scaled down the three forecast errors by the total assets of the company after the new issue has been completed. For example, the forecast error is calculated as follows:

$$SFE = \left[\frac{(A_{j,T} - F_{j,T})}{TA_j} \right] \times 100 \qquad (7)$$

SFE = Standardised forecast error

TA_j = Value of total assets of company j following official listing

The results reported in Table 3 suggest that this adjustment substantially reduces the error histogram range and the mean for all error measures. The mean standardised forecast error, the mean standardised absolute forecast error, and the mean standardised squared forecast error are 1.03, 3.75, and 2.74% respectively. The mean of the standardised forecast error is not significantly different from zero, but the mean of the standardised absolute forecast error is significantly different from zero at the 1% level. The results for non-parametric tests also show that the medians of the standardised AFE and SQFE are significantly bigger than zero.

The results for both bias and accuracy compare favourably with the results of studies of the accuracy of earnings forecasts in IPO prospectuses in the UK, New Zealand, Singapore, Hong Kong,

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[15] Patz (1989: 269) also reports that a choice of error metric can influence statistical tests. Use of forecast earnings as a base is preferred for parametric methods 'when the choice is to preserve the potential additional information content of internal measurement'. Usage of theoretically favoured actual earnings, as a base in error metrics, is preferred in non-parametric analysis since the impact of outliers is normally reduced by interval scaling.

Table 2
Panel A: Descriptive statistics of forecast errors

%	*Mean*	*Median*	*Standard deviation*	*Highest negative*	*Highest positive*
FE	33.37	1.20	370.63	−136.17	4110.53
	1.34	***1.15***	***31.39***	***−99.89***	***97.73***
AFE	54.91	12.1	368.04		
	21.00	***11.38***	***23.29***		
SQFE	1373.74	1.00	15172.45		
	9.79	***1.29***	***19.89***		

71 companies reported profits above those forecast
53 companies reported profits below those forecast

Notes: Descriptive statistics of forecast errors without two outliers given in bold.

Panel B

	Test method		
	Parametric test	*Non-parametric tests*	
%	T-Test p-value	Sign test p-value	Wilcoxon test p-value
FE	(0.32)	(0.13)	(0.37)
	(0.64)	***(0.12)***	***(0.36)***
AFE	(0.05)	(0.00)	(0.00)
	(0.00)	***(0.00)***	***(0.00)***
SQFE	(0.16)	(0.00)	(0.00)
	(0.00)	***(0.00)***	***(0.00)***

Notes: P-values for the T-test, Sign test and Wilcoxon tests, indicate the level of significance for the diference in the average (mean and median) error metrics from zero; For FE, test of average (mean and median = 0 vs. average not = 0; For AFE and SQFE, test of average (mean and median) = 0 vs. average > 0; P-values without outliers given in bold.

Panel C

Distribution of errors	
%Forecast error	*Number of companies in error category*
>100	1
91 to 100	1
81 to 90	2
71 to 80	1
61 to 70	1
51 to 60	3
41 to 50	1
31 to 40	6
21 to 30	9
11 to 20	13
0 to 10	33
−1 to −10	24
−11 to −20	8
−21 to −30	9
−31 to −40	1
−41 to −50	3
−51 to −60	2
−61 to −70	0
−71 to −80	3
−81 to −90	0
−91 to −100	2
< −101	1
	124

Table 3
Panel A: Forecast errors computed from scaling by total assets of companies

	Mean	*Median*	*Standard deviation*	*Highest negative*	*Highest positive*
SFE (%)	1.03	0.08	16.57	−28.67	177.20
	−0.30	***0.08***	***4.39***	***−28.67***	***13.92***
SAFE (%)	3.75	1.04	16.17		
	2.26	***1.08***	***3.78***		
SSQFE (%)	2.74	0.01	28.19		
	0.19	***0.01***	***0.81***		

Notes: Descriptive statistics of forecast errors without 2 outliers given in bold.

Panel B

	Test method		
	Parametric test	*Non-parametric tests*	
	T-test p-value	Sign test p-value	Wilcoxon test p-value
% SFE	(0.49)	(0.13)	(0.82)
	(0.45)	***(0.12)***	***(0.82)***
SAFE	(0.00)	(0.00)	(0.00)
	(0.00)	***(0.00)***	***(0.00)***
SSQFE	(0.14)	(0.00)	(0.00)
	(0.00)	***(0.00)***	***(0.00)***

Notes: P-values for the T-test, Sign test and Wilcoxon tests, indicate the level of significance for the difference in the average (mean and median) error metrics from zero; For FE, test of average (mean and median) = 0 vs. average not = 0; For AFE and SQFE, test of average (mean and median) = 0 vs. > 0; P-values without outliers given in bold.

Panel C

Distribution of errors	
% Forecast error	*Number of companies in error category*
> 100	1
11 to 15	2
6 to 10	3
0 to 5	65
−1 to −5	43
−6 to −10	6
−11 to −15	3
< −100	1
	124

and Malaysia which is summarised in Table 1.[16] For example, the results given in Table 2 suggest greater reliability than the −92% forecast error reported by Firth and Smith (1992) for New Zealand. This is an interesting result, since it is also a mandatory requirement for the management of IPOs in New Zealand to furnish earnings forecasts in their prospectuses. Our results are in agreement with but suggest smaller reliability than those reported by Mohamad et al. (1994) for Malaysian companies. The results suggest that Malaysian managers are, on average, unbiased and cautious forecasters. This can probably be explained by the strict regulation of IPOs in Malaysia, and the fact that managers are personally accountable to the SC for their forecasts. Another plausible explanation is that actual earnings may not necessarily be independent from forecasts, in that the management may be able to influence reported earnings through both investment decisions and accounting procedures.

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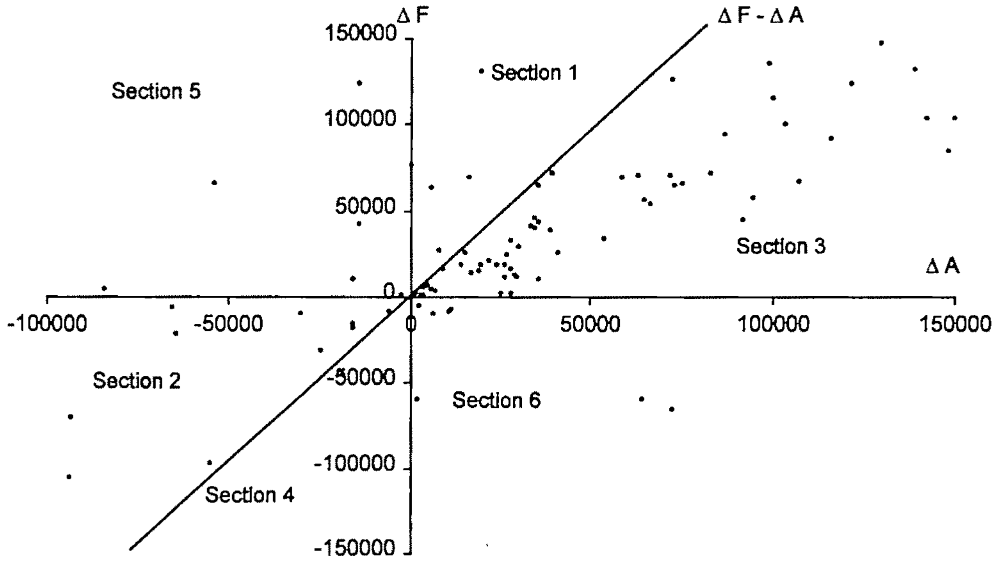
[16] A direct comparison with the results of similar studies may not be entirely objective because of different forecast intervals, and different regulatory frameworks within different economic environments. For example, in a country where profit forecasts are not mandatory, a sample of companies will be self-selected, whereas in a country with mandatory forecasts the sample will be drawn from a total population of companies (Pedwell et al., 1994). In this study the comparison with results from previous studies on forecast accuracy in Malaysia, and similar studies for New Zealand, seems to be the most objective one (the profit forecasts became mandatory in Singapore in 1993).

From a regulatory point of view, the results look less satisfactory. As stated earlier, the forecasts are mandatory and regulators tolerate deviations with a ±10% range, measured by FE. Nevertheless, 54% of the companies in the sample had forecast errors outside the SC tolerance level. As shown in Figure 1, the vast majority of companies (109 or 89% of the sample) are located in sections which indicate a forecast of the correct direction of the change in earnings.

Only 13 companies from the sample predicted the wrong direction (sections five and six). The most common mistake made by the companies with correct directional forecasts was to underestimate the size of the increase in earnings (54 companies). However, the management of 38 companies correctly forecast an increase in earnings but overestimated the size of the increase. Among those which correctly predicted a decrease in earnings, nine were over-pessimistic (section four), and eight companies underestimated the size of the decrease in earnings (section two). An interesting question for a research survey is to investigate whether, and if so to what extent, managers have attempted to improve accuracy by manipulating reported profits.

The average TIC value calculated for the whole sample, without outliers, is less than one (TIC =0.1125), implying that, overall, managers have outperformed the no-change model.[17] We also calculated TIC coefficients for individual companies.[18] The results show that 96 companies out of the 122 samples outperformed the naive model.[19] In order to examine the robustness of the results we scaled ΔF_{jT} and ΔA_{jT} by total asset, and re-calculated TIC.[20] The average TIC value calculated for the whole sample was, again, less than one (TIC=0.0730) suggesting that management outperformed the naive model.[21] This is consistent with the results from previous studies, which suggest that management is more accurate than rela-

Figure 1
Prediction realisation diagram ('00s)



Notes: $\Delta A_{j,T}$ and $\Delta F_{j,T}$ in MR (000); $\Delta F_{j,T} = F_{j,T} - PA_{j,T}$ = Forecast change in earnings for firm j for period T; $\Delta A_{j,T} = A_{j,T} - PA_{j,T}$ = Actual change in earnings for firm j for period T; $PA_{j,T}$ = Prior actual earnings for firm j at the time the forecast is made; $A_{j,T}$ = Actual earnings of firm j for period T; $F_{j,T}$ = Forecast earnings of firm j for period T; Optimistic forecasts to the left of $F\Delta_{j,T} - A\Delta_{j,T}$ line (segments 1, 2 and 5); Pessimistic forecasts to the right of $F\Delta_{j,T} - \Delta F_{j,T}$, line (segments 3, 4 and 6); Section 1 = successfully forecast an increase in earnings; Section 2 successfully forecast a decrease in earnings; Section 3 = successfully forecast an increase in earnings; Section 4 = successfully forecast a decrease in earnings; Section 5 = forecast an increase in earnings when they actually decreased; Section 6 = forecast a decrease in earnings when they actually increased.

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[17] The result with outliers was TIC =0.1152.

[18] We used the same formula but this time for a single forecast by each company.

[19] The result with outliers was 97 companies.

[20] We thank an anonymous referee for this suggestion.

[21] TIC value with outliers was 0.4901. The results for calculations with a single observation remained the same.

tively simple statistical models in forecasting earnings.

5. Determinants of forecasting accuracy

In order to examine possible determinants of earnings forecast accuracy, eight hypotheses are constructed with respect to the following potential determinants: companies' size, proportion of shares retained by the owners, forecast horizon, companies' operating history, companies gearing, auditors' reputation, industrial classification, and a decline in actual earnings.

There is some evidence in the literature that, in general, larger companies tend to have more stable earnings, hence there is a better chance of management making a more accurate earnings forecast. Several studies of analysts' forecasts of earnings (e.g. Foster et al. (1984), Bernard and Thomas (1990)) report that the earnings of smaller companies are less predictable and that post-announcement drift varies inversely with the size of the company. It is also reasonable to suggest that larger companies can commit more resources to forecasting and have better access to external information sources (Hagerman and Ruland, 1979). Furthermore, larger companies may have greater control over their market situation, and may enjoy some comparative economies of scale which make them less susceptible to economic fluctuations (Firth and Smith, 1992). Thus, to examine the relationship between the size of the company and the forecast accuracy, a negative relationship between size and the level of accuracy is hypothesised.

Different variables have been used in the literature to proxy the size of the company. For example, Firth and Smith (1992) and Mohamad et al. (1994) use total assets after the new issue as a proxy for size, whereas Mak (1994) uses total shareholders' equity immediately after the issue of the shares. In this study we use total assets after the new issue, end of year market value after the new issue, and average turnover achieved during a period of three years prior to the listing, as proxies for size.

H1: The larger the company the lower the forecast error.

The next hypothesis relates to the proportion of shares retained by the existing owners of the companies. In Malaysian context the existing major shareholders are predominantly directors of the IPO companies who are personally responsible for the earnings forecasts accuracy. A higher percentage of management share ownership (a lower percentage of share offered for sale) may indicate that the directors-owners are more confident about the future prospects of the company and are likely to commit more resources and attach a greater importance to the earnings forecast as a signal of the quality of their company. This argument is consistent with the signalling role for retained ownership suggested by Leland and Pyle (1977). Thus, a negative relationship is hypothesised between the proportion of shares retained and the forecast error.

H2: The higher the proportion of shares retained by the owners, the lower the forecast error.

Another fundamental factor that may influence the accuracy of management forecasts of earnings is the forecast horizon. Earlier research suggests a positive relationship between the length of the forecast horizon and the forecast error, i.e. accuracy tends to improve with shorter horizons (Brown et al., 1985; Collins and Hopwood, 1980; Cooper and Taylor, 1983). However, there is no conclusive evidence regarding the level of association. For example, Dev and Webb (1972) and Mak (1989) report a significant positive relationship between the forecast horizon and the forecast error in the UK and New Zealand respectively. In contrast, Firth and Smith (1992) could not find any significant relationship for IPOs in New Zealand. Mohamad et al. (1994) and Chan et al. (1996) report that the forecast horizon (although with the expected positive sign) is not statistically significant for IPOs in Malaysia and Hong Kong, respectively.

The forecast horizon is measured in terms of the number of months between the prospectus date and the end of the forecast period. Management forecasts with horizons of two to sixteen months are examined. We hypothesise a positive relationship between the forecast interval and the size of the forecast error, namely the longer the forecast period the less accurate the earnings forecast. The following hypothesis is tested:

H3: The shorter the forecast horizon, the lower the forecast error.

The profits of companies with a short or no prior operating history are likely to be more difficult to forecast, given the fact that historical data are very important inputs to the process of a forecast. Even if a new company were to rely on the operating history of other companies in the same or a related industry, the available information on the operating history of those companies is likely to be a less reliable predictor of future earnings than one's own operating history (Mak, 1989; 1994). In this study, a distinction is made between firms in respect of their operating history, and the following hypothesis is tested:

H4: Age is negatively related to the forecast error.

The fifth hypothesis relates to the relationship between the level of gearing and the degree of forecast accuracy. The widely accepted view in the literature is that the net profits of companies with a comparatively high level of debt (the interest expense) are traditionally regarded as being more volatile and thus more difficult to forecast (Firth and Smith, 1992; Mohamad et al., 1994). Consequently, a positive relationship between gearing and forecast error has normally been hypothesised and tested (Firth and Smith, 1992; Chan et al., 1996).

However, in this paper we hypothesise a negative relationship between these two variables. This is based on the fact that earning forecasts of IPOs in Malaysia are mandatory and must also be verified by the firm's advisers, who are domestic banks acting as lead underwriters.[22] The banks are jointly responsible with management for the profit forecasts and pricing of IPOs.[23] Agency theory suggests that companies with higher gearing will have higher bonding and monitoring costs. It has also been suggested that shareholders and management of high geared firms are more likely to play 'risk-shifting games' at the expense of their creditors.[24] Since banks act in the capacity of both creditors and advisers they are likely to scrutinise high-geared firms more rigorously than they do their lower-geared counterparts (so they can reduce agency cost). Thus a positive relationship between gearing and the level of accuracy is hypothesised.

H5: The higher the gearing, the lower the forecast error.

The Malaysian Securities Commission requires auditors to verify the accuracy of the forecasts and projections on the basis of the assumptions made. They are also required to confirm that the forecasts and projections have been presented on a basis consistent with the accounting policies normally adopted by the company.

The consensus in the literature suggests that the Big Six audit firms are the high quality producers of audits and are likely to be associated with more successful new issues (de Angelo, 1981). Product differentiation in the market for audits can be explained within asymmetric information and agency theory frameworks. From agency theory perspective, selection of high quality auditors will reduce high agency costs experienced by IPO firms (Simunic and Stein, 1987). Alternatively, the choice of a high quality auditor could be viewed as a signalling mechanism where high quality auditors will be selected by firms with more favourable information (Titman and Trueman, 1986). Market segmentation for audit firms in Malaysia seems to follow worldwide accepted practice with regard to the Big Six firms. The Big Six are the largest, and the firms with the 'brand name' in Malaysia. To test for the relationship between auditors' reputation and the forecast error, a dummy variable of one was assigned if the audit firm was one of the Big Six and zero otherwise. We hypothesise a negative relationship between audit reputation and the forecast error:

H6: Forecasting accuracy improves if the company's auditor is a member of the Big Six.

The empirical evidence suggests that industry membership is related to forecast accuracy (e.g. Dev and Webb (1972), Porter (1982), and Mak (1989) found some industry differences). It has been suggested that for some industries (e.g. utilities) forecasting may be easier, because their profits are likely to be less sensitive to economic cycles and also because they might be heavily regulated. However, tests of industry factors have always been problematic because of the lack of a good theoretical basis, to explain why one should expect different forecast accuracy, and the often rather crude definitions of industries. Earnings forecasts for Malaysian IPOs became even more important when the SC required IPOs in specific industries to provide a guarantee for their profit forecast with effect from January 1996.

> 'The substantial shareholders and promoters of the Main Board applicant companies involved in construction, services or specialised industries and Second Board applicant companies are required to collectively opt either for a moratorium to be imposed on disposal of their shares in the applicant companies or to provide a profit guarantee of 90% of the forecast profits as stated in the prospectus and also 90% of the submitted annual maintainable profits for the following two (2) financial years.' (SC Guidance 10–19).

It is reasonable to suggest that (prior to January 1996) IPO companies in these industries proved to be less accurate in forecasting their profits than companies in other industries. A possible theoretical base for this distinction may be that economic structural changes coupled with high growth rates in the Malaysian GDP had the

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[22] During the period 1984–95, 12 Malaysian banks acted as lead underwriters.

[23] According to the new regulation which came into effect from January 1996 directors are solely responsible for the accuracy of earnings forecasts.

[24] The 'risk-shifting games' such as Refusing to Contribute Equity Capital, and Playing for Time when a firm is in financial distress, are played by managers who are (presumably) acting in shareholders' interest. The games are manifestation of conflicts of interest between creditors and shareholders, and management's incentive to play them increases with firm borrowings.

Table 4
Descriptive statistics of sample companies (n = 122)

Variable	*Mean*	*Median*	*Std Dev*	*Minimum*	*Maximum*
AFE (%)	21.08	11.38	23.24	0.20	99.89
Size (million MR)	755.23	156.23	1905.46	28.98	14,855.10
Insiders (%)	74.50	76.06	11.12	38.89	94.01
Interval (months)	8.54	7.69	4.03	1.00	18.00
Age (years)	17.16	14.50	11.88	3.00	82.00
Gearing %	46.25	42.91	23.26	4.15	139.35
Turnover (million MR)	441.59	55.64	2,241.91	3.63	24,024.86
Market value (million MR)	853.57	160.84	3,277.22	5.15	29,850.00

Notes: ASSETS = total assets after the new issue; INSIDERS = percentage of new shares retained by owners; INTERVAL = forecast interval as the number of months between date and the year end to which the forecasts pertain; AGE = length of operating history; GEARING = the ratio of total debt to total assets after the issue; TURNOVER = average turnover for a period of three years prior to official listing; MV = end of year market value following official listing.

greatest effect on profits in these industries. For the purpose of this study, we compare companies from the service sector (trading/services, finance, hotels and properties), construction and special activities (plantation, mining and trusts) with companies from other industries. In order to test this hypothesis, companies from these three industries are assigned a dummy variable of one, while companies from other industries are assigned a value of zero. A positive relationship between industry membership and the forecast error is hypothesised.

H7: Construction, services and special activities companies have a higher forecast error when compared to companies in other industries.

Capstaff, Paudyal, and Rees (1995) report that UK analysts are more inaccurate where firms experience a reduction in earnings than when earnings increase. It is indicated that this result may be related to the relationship between analysts and forecaster firms. In this study, we hypothesise that management may be less accurate in forecasting a decrease in earnings in IPO prospectuses. This may not necessarily be a consequence of poor forecasting, but it could be linked to Malaysian regulation, which does not allow book building and requires an offer price to be stated in the prospectus. In this regulatory environment it is reasonable to expect that investors would use profit forecasts and relevant price earnings ratios in order to estimate a market price for the IPO. Managers may be, therefore, reluctant to forecast a decline in earnings.[25] To test this hypothesis we introduce a dummy variable into our regression model, taking a value of one if the company experienced a negative change in actual earnings, and zero for a positive change in actual earnings.[26]

H8: The forecast error will be higher for the companies with a decline in actual earnings.

Hypotheses one through eight are tested by the following multiple regression with the error metric:

$$\begin{aligned} AFE = \alpha + \beta_1 SIZE + \beta_2 INSIDERS + \\ \beta_3 INTERNAL + \beta_4 AGE + \beta_5 GEARING + \\ \beta_6 AUDITOR + \beta_7 INDUSTRY + \\ \beta_8 EREDUCTION + \varepsilon \end{aligned} \qquad (8)$$

In the above equation, the absolute forecast error for each company is used as the dependent variable. The R^2 and F-statistics are used to test whether the above mentioned variables could significantly explain absolute forecast errors. It is worth stressing that two companies with very high forecast errors have been omitted from the sample. The measures of size (SIZE), retained ownership (INSIDERS), forecasting interval (INTERVAL), age (AGE), gearing (GEARING), auditors' reputation (AUDITOR), industry factors (INDUSTRY), and reduction in actual earnings (EREDUCTION), are used as explanatory variables. One-tailed t-test with 10% significance level is performed to identify the major factors in determining the forecast accuracy.

Descriptive statistics of the major variables are reported in Table 4. The average age of the IPO at the time of listing is about 17 years.[27] The size of the sample companies vary substantially. The biggest company with total assets amounting to

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[25] Firth (1997; 1998) reports that the earnings forecasts play an important part in initial market valuations in New Zealand and Singapore, countries with a similar regulatory environment to the one in Malaysia.

[26] We thank an anonymous referee for this suggestion.

[27] In the case of new companies with subsidiaries that had been incorporated for a long time before the IPO the age of the oldest subsidiary is used.

Malaysian Ringgits (MR) 14,855.10m is Telecom Malaysia, while a company with the lowest size (MR 28.98m) is Malpac Holdings. The market capitalisation of the IPO, at the end of the first year after listing ranged from MR 5.15m to MR 29,850.00m (Tenaga Nasional, privatised company for production, transmission, and distribution of electricity). SC rules require IPOs to disclose a trading history for at least three years. Average turnover for three years prior to listing was about MR 441.59m. On average, the owners of the sample firms retained just under three quarters of their ownership after the initial public offers with a range from 38.89 to 94.01%. The sample firms had a mean forecast horizon of 8.54 months. The forecast horizon varied between one and 18 months.[28] The average gearing (Total Liabilities/Total Assets) was 46.25% with a range of 4.15% to 139.35%.

The correlation matrix in Table 5 suggests that no multi-collinearity problem exists among the independent variables in this study. Larger companies tend to have a lower percentage of management share ownership, and lower gearing ratio then their smaller counterparts.

The results of the multiple regression model are shown in Table 6. Regression 1 explains 17.9% of the variation in absolute forecast error. Coefficients for all variables, except for auditors, have the expected sign. The age variable is statistically related to the level of forecast accuracy at 10% level, suggesting that a longer operating history tends to improve forecast accuracy. The coefficient for industry is positive and statistically significant at 5% level. This, to some extent, may explain recent changes in the regulation regarding IPO applications from these industries. The coefficient for decline in earnings (dummy variable) is positive and significant at 1% level. This gives support to our hypothesis that managers may be reluctant to forecast a decline in earnings.

Interval and gearing have expected positive signs, though not significant. The result for the forecast interval is consistent with results reported in Firth and Smith (1992) who explain the lack of a significant relationship between forecast error and forecast interval with a relatively short forecast interval during which new funds are more difficult to employ.[29] An alternative explanation for a weak relationship between forecast accuracy and forecast intervals has been suggested by Ferris and Hayes (1977) who found a negative relationship between the length of forecast interval and forecast error in the UK. They argue that longer forecast horizons provide greater flexibility with respect to maintenance and capital expenditure decisions and this enables management to improve the accuracy of earnings forecasts.

The auditor variable has an unexpected positive sign, but the coefficient is not statistically significant. More reputable auditors seem not to be associated with better predictive accuracy in Malaysia. This result is consistent with the findings of Firth and Smith (1992), Mohamad et al. (1994), and Firth et al. (1995).

The coefficient for size, measured by total assets, is negative but not statistically significant. This is consistent with the results reported by Hagerman and Ruland (1979), Mohamad et al. (1994), and Firth et al. (1995). However, our results contradict results reported in Ferris and Hayes (1977), Firth and Smith (1992), and Chan et al. (1996), who found that managers in larger firms tend to be less accurate than managers in smaller firms. The lack of a significant relationship in our study may be due to the fact that the size is measured by the total assets immediately after the issue. However, in many cases the total assets of the Malaysian IPOs increased significantly after the issue. This makes factors put forward in our hypothesis of perhaps limited relevance because they relate to the firms' characteristics before the new issue. We run a regression with the natural logarithm of the average turnover for a period of three years prior

Table 5
Correlation matrix of independent variables (n = 122)

	ln Assets	*Insiders*	*Gearing*	*Auditor*	*Industry*	*ln (1+Age)*	*Interval*
EReduction	0.07571	−0.09022	−0.03944	−0.21444	−0.05092	0.05304	−0.7921
ln Assets		−0.25845	−0.37999	−0.13691	−0.16207	−0.22649	−0.15964
Insiders			0.025963	0.00783	−0.04034	−0.05614	0.10842
Gearing				0.113106	−0.15777	−0.00024	0.09088
Auditors					0.02197	0.03256	−0.00878
Industry						−0.07740	−0.11090
ln (1+Age)							0.08480

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[28] Although the forecast period is required not to be less than three months, KIB Textiles was approved for listing with only a month forecast, while Tenaga Nasional (privatised company) provided a profit forecast with an 18 months forecast horizon.

[29] Average forecast intervals in Firth and Smith (1992) and in our study are 7.23 and 8.5 months respectively.

Table 6
Regression of absolute forecast errors testing Hypotheses 1 through 8

Variable	*Regression 1*	*Regression 2*	*Regression 3*	*Regression 4*
Intercept	39.27 (1.64)*	13.00 (0.58)	9.08 (0.40)	51.79 (1.48)*
INSIDERS	−0.045 (−0.23)	−0.103 (−0.56)	−0.073 (−0.40)	−0.070 (−0.35)
INTERVAL	0.287 (0.57)	0.051 (0.10)	0.051 (0.37)	0.266 (0.52)
AGE	−5.669 (−1.46)*	−4.866 (−1.29)	−6.436 (−1.72)**	−5.539 (−1.42)*
GEARING	−0.0054 (−0.69)	−0.114 (1.24)	−0.085 (−0.95)	−0.064 (−0.65)
AUDITORS	0.297 (0.07)	−0.337 (−0.08)	−0.730 (−0.18)	0.129 (0.03)
INDUSTRY	8.970 (2.12)**	8.725 (2.12)**	8.216 (1.99)**	8.874 (2.09)**
EREDUCTION	20.316 (3.75)***	18.854 (3.47)***	20.533 (3.85)***	20.150 (3.70)***
ASSETS	−0.536 (−0.26)			−1.542 (−0.53)
TURNOVER		2.381 (1.64)*		
MV			2.496 (1.78)**	
INTERACTION				0.041 (0.49)
R^2 (%)	17.9	19.7	20.1	18.0
Adjusted R^2 (%)	12.1	14.1	14.4	11.5
F-value	3.07 (0.004)	3.47 (0.001)	3.54 (0.001)	2.74 (0.006)
N	122	122	122	122

Notes: 1. t-statistics for 1-tail test given in parenthesis; *** 1% significance; ** 5% significance; * 10% significance 2. P = values in parenthesis for F-value
ASSETS = ln (total assets after the new issue; MR millions); INSIDERS = percentage of new shares retained by owners; INTERVAL = forecast interval as the number of months between prospectus date and the year end to which the forecasts pertain; AGE = ln (1+length of prior operating history); GEARING = the ratio of total debts to total assets after the issue; AUDITOR = a dummy variable taking a value of one if the firm is from services, construction or special industries; INDUSTRY = a dummy variable taking a value of 1 if the firm is from construction, services, or special industries; TURNOVER = ln (average turnover for a period of three years prior to official listing); MV = ln (end of year market value after the new issue; MR millions); EREDUCTION = a dummy variable taking a value of 1 if the firm size experienced negative changes in earnings; INTERACTION = a product of a dummy set equal to one if SIZE is greater than the sample median and INSIDERS

to the prospectus as a proxy for size (regression 2). A higher R^2 is obtained, with an expected negative sign for the auditors variable. However, turnover was positive and significant at 5% level, and similar results were obtained with market values as proxies for size (regression 3).

The coefficient corresponding to insiders has the expected negative sign, but it is not statistically significant. As suggested in the correlation matrix of independent variables, insiders are negatively correlated with assets. In order to evaluate any incremental effect of management share ownership in large firms we run regression 4 with an additional interaction term between total assets and insiders.[30] Reported results indicate that coefficients for both insiders and size had the expected negative sign but are not statistically significant. The interaction term is positive and not significant. These findings give no evidence for an incremental effect of management share ownership in large firms.

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[30] We are grateful to Professor Ken Peasnell for this suggestion.

6. Conclusions

The primary objective of this study is to examine the accuracy of earnings forecasts included in the prospectuses of Malaysian companies seeking listing on the KLSE main board. Studies on the accuracy of earning forecasts made by management in prospectuses of IPOs are very limited due to the lack of such forecasts in many markets. This could be due to the fact that making a specific quantitative forecast in some countries may entail risks that could be costly (US and Canada) and that forecasts are not mandatory (UK and Hong Kong). Malaysia is one of the few countries where the management of IPOs are required to disclose (and now in some cases to guarantee) profit forecasts in their prospectuses.

Accuracy is measured for 124 companies during the period 1984–95 by forecast errors, absolute forecast errors, squared forecast errors and standardised forecast errors. The results suggest that, on average, managers under-forecast earnings by 33.37%. A comparison with the naive no-change model in earnings, suggests that 96 out of 122 companies outperform this model. Overall, managers seem to be unbiased but cautious forecasters. However, results of multiple regressions suggest that managers are reluctant to forecast a reduction in earnings.

A number of plausible company specific characteristics (size, age, forecast interval, gearing, proportion of shares retained by owners, and industry) and the reputation of auditors responsible for the accuracy of the forecasts are tested. The results reveal that both the age and industry classification of the company are statistically significant.

Profit forecast accuracy of prospectuses in this study compares favourably with the results reported in similar studies for the UK, Hong Kong, New Zealand, and Singapore. Of particular interest is the comparison with New Zealand, where there is a mandatory requirement for companies to furnish earnings forecasts in their prospectuses. Two interesting questions for further research surveys are first, to investigate whether, and if so to what extent, managers have taken action to improve accuracy by manipulating reported profits; and second, to examine the explanations that have been given by companies which had forecast errors which exceeded the ±10% tolerated by the regulators and how the Securities Commission dealt with these cases. Given the heavily regulated pricing mechanism and the flotation boom associated with extremely high reported initial premiums and positive long-run returns of Malaysian IPOs, a final interesting question for further research may be to investigate the relationship between bias in management earnings forecast and short and long term performances of the IPOs.

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International harmony measures of accounting policy: comparative statistical properties

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Abstract—Van der Tas's (1988) I index and the between-country C index introduced by Archer et al. (1995) are competing measures of international harmony. We present comparative statistical properties of these indices, via a simulation study covering three accounting methods in 10 countries, with uniform, bimodal and unimodal distributions of companies across accounting methods. The indices are also adjusted for non-disclosures using techniques developed by Archer and McLeay (1995) and Archer et al. (1995). The I index and the between-country C index are mathematically equivalent in the two-country case even in the presence of non-disclosures. As more countries are compared, the two indices diverge. The means and standard deviations of the I index, with a correction proposed by Archer and McLeay (1995), decrease and there is little skewness or kurtosis. In contrast, as more countries are compared, the between-country C index exhibits more stability in means, lower standard deviations, higher skewness and kurtosis. The between-country C index may be superior to the corrected I index because (i) between-country C index means approximate their 'expected values' (where all observations equal expected values) more closely than do corrected I index means; and (ii) between-country C index means are more stable than corrected I index means where the data come from stable distributions.

1. Introduction

Beginning with van der Tas (1988), a stream of literature[1] has examined national and international harmony[2] of accounting policies using a number of index measures. These measures are van der Tas's H, I and C indices, and two derivatives of the C index—the between-country C index and the within-country C index—identified by Archer et al. (1995). The I index and the between-country C index are measures of international harmony. Little is known about their statistical properties as more countries are compared or as the distribution of companies across accounting methods changes. We examine these properties using a simulation study. Techniques to adjust the C index for non-disclosures, suggested by Archer and McLeay (1995) and Archer et al. (1995), are extended to the I index.

2. Background to harmony measures

Van der Tas (1988) introduced to the accounting literature precise ways of measuring national and international harmony of accounting policies. National harmony is measured by the H or Herfindahl index, used in industrial concentration studies. H is the sum over accounting methods of their squared frequencies of use within a single country, that is:

$$H = \sum_{i=1}^{k} p_i^2$$

where H = the Herfindahl index
k = number of alternative accounting methods
p_i = the relative frequency of accounting method i.

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[1] See for example Emenyonu and Gray (1992, 1996), Hermann and Thomas (1995), Archer and McLeay (1995), Archer et al. (1995, 1996).

[2] According to Tay and Parker (1990: 73), harmony is a state indicated by a clustering of companies around one or a few available accounting methods, whereas harmonisation is a process of movement away from total diversity of accounting methods. For simplicity we refer only to harmony measures, but our conclusions apply equally to measures of harmonisation. We cover only de facto or material harmony which refers to what companies actually do, rather than de jure or formal harmony which refers to accounting standards and similar regulations. For measures of formal harmony, see Rahman et al. (1996).

For international comparisons, van der Tas introduced the I index as an analogue of the H index. He defined the I index as:

$$I=\sum_{i=1}^{k}(f_{i1}\,f_{i2}\cdot\cdot\,.f_{im})$$

where f_{i1}, f_{i2}, ...f_{im} are the relative frequencies of accounting method i in each of m countries and k is the number of alternative accounting methods. Van der Tas's I index is the sum over accounting methods of the product of the relative frequencies of accounting method i in each of m countries.

The I index tends to zero as more countries are compared, since additional relative frequencies will almost always be fractions, resulting in a skewed distribution for I over the range 0-1. To overcome this skewness, van der Tas suggested applying the (m-1)th root as a correction factor:

$I^* = I^{1/(m-1)}$

where I^* = corrected I index

m = number of countries.

Archer and McLeay (1995) have criticised van der Tas's formulation of the I index. They argue that the correction factor 1/(m-1) is not consistent with the I index being an analogue of the H index because 1/(m-1) does not equal 2—the exponent in the H index—and is applied to the sum of cross products and not to individual cross products for each accounting method. To ensure that the I index is an analogue of the H index, Archer and McLeay (1995: 4) suggest that the I index be calculated as:

$$I=\sum_{i=1}^{k}(f_{i1}\,f_{i2}\cdot\cdot\,.f_{im})^{2/m}$$

where m is the number of countries and k the number of accounting methods as before. Archer and McLeay's I index is the sum across accounting methods of the squared geometric means of the relative frequencies of accounting method i in each of m countries. In the two country case, the exponent equals 1 and the corrected and uncorrected I indices are equivalent.

Van der Tas (1988) also introduced the comparability or C index as a means of dealing with companies using multiple accounting policies for the same issue (e.g. via footnote disclosures), although the index can be employed as an alternative to the H and I indices. The C index is based on combinatorial mathematics and measures the probability that any pair of randomly selected companies adopts the same accounting method. It is the number of company pairs in which each pair uses the same accounting method, summed over accounting methods and divided by the number of possible pairs if all companies used the same accounting method (Archer and McLeay, 1995: 5–6). Pair members can be from the same or different countries. Algebraically, van der Tas's C index is:

$$C=\frac{\sum_{j=1}^{k}(x_j\,(x_{j-1}))}{n\,(n-1)}$$

where x_j is the number of companies using accounting method j, k the number of accounting methods, and n the total number of companies.

Van der Tas showed that the H index and his C index were related thus (assuming no multiple reporting):

$$C=\frac{H-1/n}{1-1/n}\text{ or }H=\left(\frac{n-1}{n}\right)C+\frac{1}{n}$$

where n is the total number of companies. As n → ∞, C → H. The convergence occurs rapidly for even moderate values of n.

When used to measure international harmony, van der Tas's C index does not distinguish between national and international effects. To correct this deficiency, Archer et al. (1995) decomposed van der Tas's C index into a between-country C index and a within-country C index, the former being used for measuring international harmony of accounting policies. The between-country C index is the number of pairs of companies using the same accounting method, where each pair member is from a *different* country, divided by the total number of company pairs if all companies used the same accounting method but each pair member is from a different country. Intuitively, the between-country C index gives the probability that any pair of randomly selected companies, each from a different country, uses the same accounting method. Using Archer et al.'s (1995) notation, the between-country C index is:

$$\frac{\sum_i \sum_j x_{ij}\,(x_{+j}-x_{ij})}{\sum_i x_{i+}\,(x_{++}-x_{i+})}$$

where x_{ij} is the number of companies in country i using accounting method j, x_{+j} is the total number of companies in all countries using method j, x_{++} is the grand total of companies across countries, and x_{i+} is the number of companies in country i.

The within-country C index is the number of pairs of companies using the same accounting method, where each pair member comes from the *same* country, divided by the sum across countries of the number of company pairs in each country if all companies used the same accounting method. Using Archer et al.'s (1995) notation, the within-country C index is:

$$\frac{\sum_i \sum_j x_{ij}\,(x_{ij}-1)}{\sum_i x_{i+}\,(x_{i+}-1)}$$

To illustrate, Table 1 shows the I indices, with Archer and McLeay's correction, and the between-country C indices for fixed asset valuation in three countries A, B and C. Samples of 50 companies from each country use historical cost, replacement cost, and net realisable value in the numbers shown. Historical cost and replacement cost are equally popular in country A, net realisable value predominates in country B, while the three methods are used evenly in country C. The I index for countries A/B is low because of the non-use of net realisable value in country A and replacement cost in country B. The I indices for A/C and B/C exceed A/B because the three accounting methods are used evenly in country C and boost the I indices for A/C and B/C. The between-country C index for each two-country comparison equals its corresponding I index, a point which will be returned to later.

Archer and McLeay (1995: 5, 10–11) argue that the between-country C index is a more robust measure of international harmony than the I index. The I index tends to zero if one or more accounting methods have low frequencies in one country. In particular, the contribution of an accounting method to the I index is zero if that method is not used in one country, even if it is widely used in all other countries. The between-country C index avoids these problems. For example, in Table 1, the three country I index, with Archer and McLeay's correction, is only 0.07, yet the corresponding between-country C index is 0.24, because (as already mentioned) net realisable value and replacement cost are not used in countries A and B respectively, and hence contribute nothing to the I index even though these accounting methods are used by 103 companies (69%) in the total sample.

The between-country C index and the Archer and McLeay-corrected I index are competing measures of international harmony with the between-country C index superior to the corrected I index, if Archer and McLeay's criticisms are accepted. Beyond simple examples like Table 1, little is known of the relationship between these indices as more countries are compared. Also little is

Table 1
Numerical example

	Country			
	A	*B*	*C*	*Total*
Historical cost	25	5	17	47
Replacement cost	25	0	16	41
Net realisable value	0	45	17	62
Total	50	50	50	150
	A/B	*B/C*	*A/C*	*A/B/C*
Archer and McLeay I index	0·05	0·34	0·33	0·07
Between-country C Index	0·05	0·34	0·33	0·24

Calculations:

Archer & McLeay I index:
A/B: $(25/50 \times 5/50) + (25/50 \times 0/50) + (0/50 \times 45/45) = 0{\cdot}05$
B/C: $(5/50 \times 17/50) + (0/50 \times 16/50) + (45/50 \times 17/50) = 0{\cdot}34$
A/C: $(25/50 \times 17/50) + (25/50 \times 16/50) + (0/50 \times 17/50) = 0{\cdot}33$
A/B/C: $(25/50 \times 5/50 \times 16/50)^{2/3} + (25/50 \times 0/50 \times 16/50)^{2/3} + (0/50 \times 45/50 \times 17/50)^{2/3} = 0{\cdot}07$

Between-country C index:
A/B: $[25(5) + 25(0) + 0(45)] / (50 \times 50) = {\cdot}05$
B/C: $[5(17) + 0(16) + 45(17)] / (50 \times 50) = {\cdot}34$
A/C: $[25(17) + 25(16) + 0(17)] / (50 \times 50) = {\cdot}33$
A/B/C: $[[25(5) + 25(0) + 0(45)] + [17(25 + 5)] + [16(25 + 0)] + [17(0 + 45)]] / [(50 \times 50) + (50 \times 100)] = 0{\cdot}24$

Table 2
Index Formulae

Panel 1

	Country A	*Country B*	*Country C*	*Country D*
Method 1	a_1	b_1	c_1	d_1
Method 2	a_2	b_2	c_2	d_2
Method 3	a_3	b_3	c_3	d_3
Total	n_a	n_b	n_c	n_d

Panel 2

Countries I Index with Archer and McLeay's correction

A/B

$$\frac{a_1b_1 + a_2b_2 + a_3b_3}{n_an_b}$$

A/B/C

$$\frac{(a_1b_1c_1)^{2/3} + (a_2b_2c_2)^{2/3} + (a_3b_3c_3)^{2/3}}{(n_an_bn_c)^{2/3}}$$

A/B/C/D

$$\frac{(a_1b_1c_1d_1)^{2/4} + (a_2b_2c_2d_2)^{2/4} + (a_3b_3c_3d_3)^{2/4}}{(n_an_bn_cn_d)^{2/4}}$$

Panel 3

Countries between-country C index

A/B

$$\frac{a_1b_1 + a_2b_2 + a_3b_3}{n_an_b}$$

A/B/C

$$\frac{a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3)}{n_an_b + n_c(n_a + n_b)}$$

A/B/C/D

$$\frac{a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3) + d_1(a_1+b_1+c_1) + d_2(a_2+b_2+c_2) + d_3(a_3+b_3+c_3)}{n_an_b + n_c(n_a + n_b) + n_d(n_a + n_b + n_c)}$$

known about the indices' sensitivity to variations in the distribution of companies across accounting methods as more countries are compared. Accordingly, further examination of these matters is warranted.

Table 2 contains an algebraic example which shows how the corrected I index and the between-country C index evolve as additional countries are compared. Three accounting methods are used by a1, a2 and a3 companies in country A, by b1, b2 and b3 companies in country B and so on for four countries as shown in panel 1. Applying the formulae described above and rearranging terms, the corrected I index and the between-country C index appear in panels 2 and 3 respectively.

In the two country case, the corrected I index and the between-country C index are identical. The identity can be shown to hold for any number of accounting methods. For more than two countries, the two indices diverge, but each evolves in a systematic pattern. Panel 2 shows that as an additional country D is added to the corrected I index, the marginal change to the numerator is that the number of companies using method i in country D is multiplied by the product of the number of companies using method i in countries A, B and C, while the marginal change to the denominator is that the number of companies in country D is multiplied by the product of the numbers of companies in countries A, B and C. In both numerator and denominator, the exponents equal two divided by the number of countries.

Panel 3 shows that as an additional country D is added to the between-country C index, the marginal change to the numerator is that the number using method i in country D is multiplied by the sum of the numbers using method i in countries A, B and C, while the marginal change to the denominator is that the total number in country D is multiplied by the sum of the totals in other countries. That is, as additional countries are added marginal changes to the indices involve *products*, and a change to the exponents to reflect the number of countries, for the corrected I index and *sums* for the between-country C index.

3. Simulation study

Table 2 does not show the statistical properties of the two indices as more countries are compared. Using a simulation study, we investigate these properties. The study is designed to be similar to Emenyonu and Gray (1992, 1996) and Herrman and Thomas (1995) in sample size, number of accounting methods and number of countries.

Samples of 50 companies were drawn from each of 10 countries, with 250 iterations of the selection process. Within each country, there are three accounting methods covering a particular accounting issue. Companies are assumed to be distributed across accounting methods in three mutually exclusive ways: (a) uniformly[3] so that the probability of companies choosing accounting method i in country m is the same for all i and m; (b) bimodally so that the probability of companies choosing either of two accounting methods—the same two in all countries—is twice that of choosing the third accounting method; (c) unimodally so that the probability of one accounting method being chosen is three times the probability of either of the other methods being chosen.

In the unimodal data set, the dominant accounting method alternates across countries, being the first in countries 1, 4, 7 and 10, the second in countries 2, 5 and 8, and the third in countries 3, 6 and 9. For the uniform data set, there is also a fourth accounting 'method' (dealt with later) representing companies which do not disclose how they account for the particular issue. The expected value of each observation in the uniform data set is 50/4 or 12.5. For the other data sets, companies were assigned to accounting methods using the Poisson distribution with mean values for each dominant accounting method of 20 in the bimodal, and 30 in the unimodal, data set. So expected values of the three accounting methods are 20, 20 and 10 in the bimodal data set and 30 for the dominant accounting method and 10 for each of the other two methods in the unimodal data set.

An important issue is what statistical properties of the corrected I index and the between-country C index to measure. The uniform and the bimodal data sets have stable distributions of companies across accounting methods while the unimodal data set has three different distributions, depending on which accounting method is dominant, the first for countries 1, 4, 7, 10, the second for countries 2, 5, 8 and the third for countries 3, 6, 9. Therefore, it seems reasonable to compare the stability of the I index and the between-country C index across the three data sets. Stability will be measured by examining changes in the means, standard deviations, skewness and kurtosis of each index as more countries are compared. Stability will also be examined by comparing each index's mean with its 'expected value', which is the value of each index where *all* observations in the underlying data set equal their expected values. This comparison is of interest because it indicates how extensively the obtained means have been affected by variability in the data sets.

3.1. Simulation results—the I index

Table 3, panel 1 shows the means, standard deviations, skewness and kurtosis for the I index with Archer and McLeay's correction where the underlying data are uniformly distributed. Panels 2 and 3 show these results for the bimodal and unimodal data sets respectively. In each panel, the final row shows the index's 'expected value'.

For the uniform data set in panel 1, the means and standard deviations for Archer and McLeay's I index[4] both decline, but at a decreasing rate, as more countries are compared. There is no pronounced skewness or kurtosis. Similar results occur for the bimodal data set in panel 2, except that

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[3] Tay and Parker (1990: 85) suggested the uniform distribution as a benchmark against which to judge actual practices. SPSS for Windows 95 was used to randomly allocate companies to accounting methods in each country. An unavoidable imperfection in the simulation with the uniform distribution is that SPSS gives numbers for each accounting method i in country m which are not whole numbers, but are correct to 14 decimal places. The problem also occurs with other packages such as Excel. It is unlikely that the imperfection biases our results. The problem does not occur with the bimodal and unimodal data sets.

[4] By way of comparison, for each data set, the mean of the unadjusted I index declines sharply as the number of countries increases, the mean index for m countries being approximately one third of the mean index for m-1 countries. The standard deviation also declines sharply. The distribution of the index becomes markedly positively skewed and leptokurtic for the uniform and unimodal data sets. These results demonstrate the tendency, noted originally by van der Tas (1988), for the uncorrected I index to tend to zero as more countries are compared. Like Archer and McLeay's correction, van der Tas's correction to the I index arrests the decline in the unadjusted I index. For the uniform data set, the mean I index with van der Tas's correction declines steadily as more countries are compared from 0.329 for 2 countries to 0.287 for 10 countries, and the standard deviation declines. For the bimodal data set, the means for the van der Tas I index increase from 0.354 for 2 countries to 0.378 for 10 countries, and the standard deviation declines. Neither index exhibits pronounced skewness. For the unimodal data set in panel 3, the means for the van der Tas I index fluctuate in a narrow band between 0.270 and 0.287, while the standard deviation declines, and there is no pronounced skewness or kurtosis. In each data set, for three or more countries, the mean van der Tas I index is always greater than the corresponding mean Archer and McLeay I index, which in turn is always greater than the mean unadjusted I index. As more countries are compared, the means of the unadjusted I index converge on the 'expected values'. In contrast, the van der Tas I index, like the Archer and McLeay I index, systematically tracks below its 'expected value'.

Table 3
Simulation results — the I index with Archer and McLeay's correction

Panel 1: Uniform data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·329	0·280	0·250	0·226	0·215	0·206	0·197	0·193	0·189
s.d.	0·115	0·093	0·074	0·063	0·056	0·053	0·049	0·045	0·043
skewness	0·097	0·379	0·241	0·296	0·223	0·301	0·283	0·235	0·229
kurtosis	0·199	0·187	0·093	−0·315	0·004	−0·054	0·041	−0·053	0·064
expected value	0·333	0·333	0·333	0·333	0·333	0·333	0·333	0·333	0·333

Panel 2: Bimodal data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·354	0·345	0·339	0·336	0·334	0·332	0·330	0·329	0·328
s.d.	0·033	0·029	0·026	0·024	0·023	0·021	0·020	0·019	0·019
skewness	0·693	0·590	0·376	0·162	−0·103	−0·384	−0·633	−0·383	−0·460
kurtosis	1·461	0·562	0·563	0·494	0·746	2·033	2·472	1·638	1·513
expected value	0·360	0·360	0·360	0·360	0·360	0·360	0·360	0·360	0·360

Panel 3: Unimodal data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·277	0·240	0·240	0·231	0·220	0·220	0·218	0·213	0·212
s.d.	0·038	0·037	0·039	0·032	0·039	0·040	0·036	0·039	0·040
skewness	0·138	−0·428	−0·445	−0·903	−0·822	−1·113	−1·174	−1·079	−1·101
kurtosis	0·195	0·051	0·225	1·006	0.558	1·502	1·473	0·820	0·812
expected value	0·280	0·250	0·259	0·255	0·250	0·252	0·252	0·250	0·251

the index is leptokurtic for 7 or more countries. For the unimodal data set in panel 3, the Archer and McLeay I index means decline as more countries are compared, the rate of decline increasing for three, six and nine country comparisons when the three distributions of accounting methods occur in equal numbers. Standard deviations remain steady; there is negative skewness but no pronounced kurtosis.

In panels 1 and 2, the 'expected values' of the Archer and McLeay I index are 0.333 and 0.36 respectively for all countries. However, the obtained means fall increasingly below these amounts, by more than two standard deviations for six or more countries (panel 1) or for three or more countries (panel 2). In panel 3, the means also fall by increasing amounts below the corresponding 'expected values', but in each case by less than one standard deviation.

3.2. Simulation results—the between-country C index

Table 4 shows the means, standard deviations, skewness, kurtosis and 'expected values' of the between-country C index for the uniform data set (panel 1), bimodal data set (panel 2) and unimodal data set (panel 3).

In panels 1–3, the two country columns are identical to the equivalent columns for the I indices in panels 1–3 of Table 3. As more countries are compared, the mean between-country C index is stable for the uniform and bimodal data sets, but increases steadily for the unimodal data set. In all three panels, the standard deviation declines. As more countries are compared, the index becomes increasingly positively skewed for the uniform data set, and leptokurtic for the uniform and unimodal data sets.

Table 4
Simulation results — between-country C index

Panel 1: Uniform data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·329	0·335	0·336	0·333	0·334	0·333	0·333	0·333	0·333
s.d.	0·115	0·074	0·048	0·037	0·03	0·026	0·023	0·021	0·018
skewness	0·097	0·904	1·048	1·027	1·018	1·131	1·311	1·457	1·559
kurtosis	0·199	1·363	1·608	1·656	1·392	1·511	2·269	3·038	3·398
expected value	0·333	0·333	0·333	0·333	0·333	0·333	0·333	0·333	0·333

Panel 2: Bimodal data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·354	0·355	0·354	0·354	0·354	0·354	0·354	0·354	0·354
s.d.	0·033	0·026	0·021	0·019	0·017	0·015	0·013	0·013	0·012
skewness	0·693	0·983	0·831	0·788	0·727	0·681	0·502	0·670	0·557
kurtosis	1·461	0·807	0·428	−0·024	−0·047	0·229	−0·236	0·328	−0·111
expected value	0·360	0·360	0·360	0·360	0·360	0·360	0·360	0·360	0·360

Panel 3: Unimodal data set

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·277	0·284	0·309	0·312	0·314	0·319	0·320	0·321	0·324
s.d.	0·038	0·023	0·017	0·010	0·009	0·008	0·006	0·005	0·005
skewness	0·138	−0·241	0·460	0·593	0·804	0·507	0·524	0·324	0·375
kurtosis	0·195	−0·383	0·522	0·906	2·958	0·910	1·164	1·149	0·904
expected value	0·280	0·280	0·307	0·312	0·312	0·318	0·320	0·320	0·323

The C index mean values closely track their 'expected values' in panel 1, and fall just below their 'expected values', on average by 0.006 in panel 2. In both cases, the differences are all less than one standard deviation. Interestingly, the 'expected values' for the between-country C index in panels 1 and 2 are constant for all countries and are the same as for the Archer and McLeay I indices in panels 1 and 2 of Table 3. In panel 3 of Table 4, the 'expected value' rises from 0.28 for two countries to 0.323 for 10 countries, and the obtained means closely track above the 'expected values', again by less than one standard deviation in all cases.

The between-country C index means from the simulation always exceed their I index counterparts for three or more country comparisons. Figure 1 shows index means for the uniform data set.

4. Adjusting indices for non-disclosures

Failure to disclose the use (or non-use) of a particular accounting method can be a confounding factor in studies of national or international harmony. The impact of non-disclosures increases with their relative frequency. Archer and McLeay (1995) and Archer et al. (1995) suggest three alternative ways to handle non-disclosures[5]—they can be omitted from all statistical analyses, treated as

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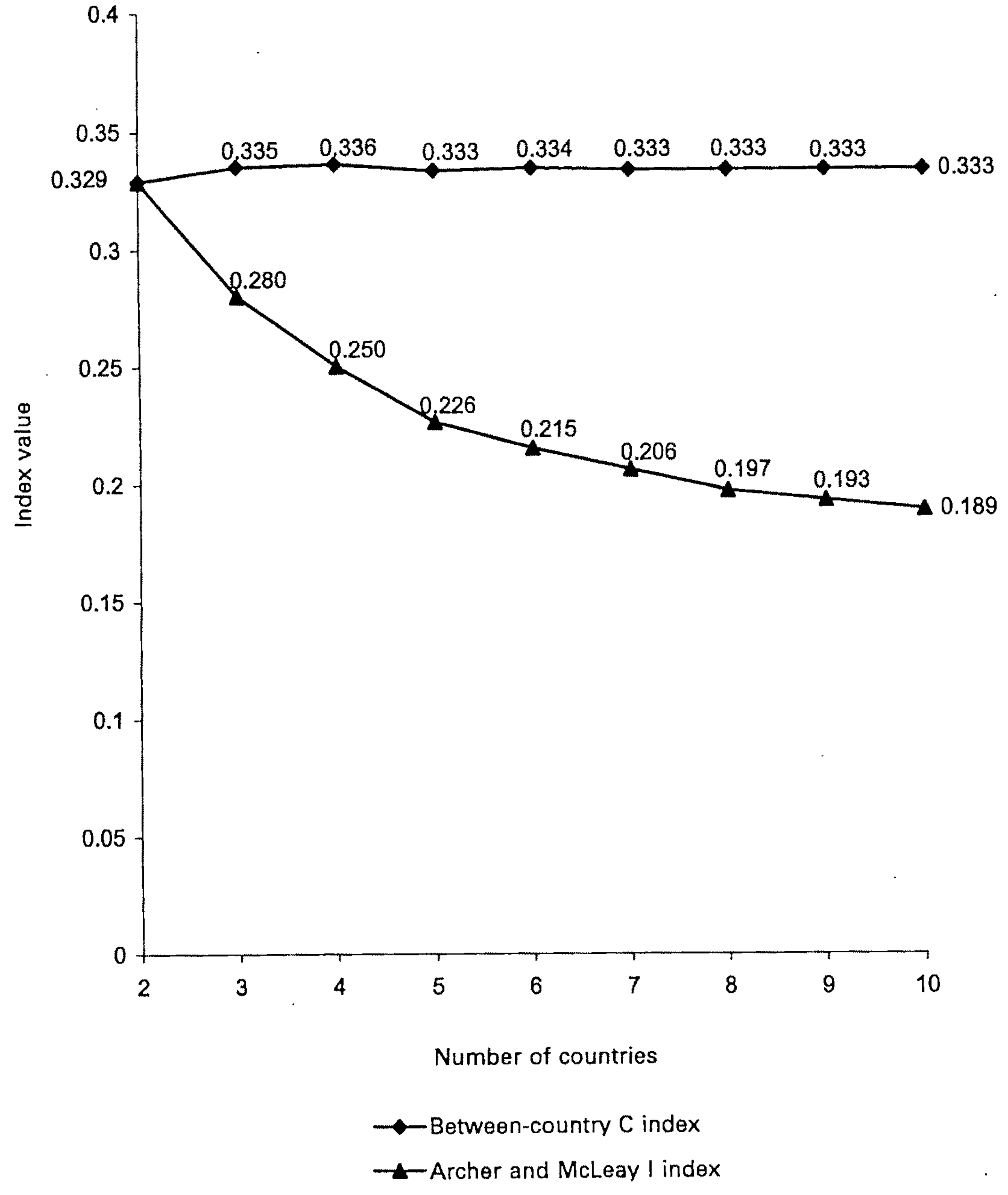
[5] They also state that sometimes a 'default' assumption may be made whereby non-disclosers can be assumed, from the surrounding circumstances, to use a particular method, such as one required by an accounting standard. In that case, non-disclosers can simply be added to companies disclosing that they do use the method. Archer et al. (1996), in their statistical modelling of harmonisation, also treat non-disclosures as if they were a separate accounting method.

Figure 1
Corrected I index and between-country C index (uniform data set)



not applicable, or treated as if the item exists but is not disclosed. Their suggestions were made in the context of the C index. Treating non-disclosures as not applicable means that each non-disclosing firm is comparable with all other non-disclosers and with every disclosing firm for the item in question. The C index must be adjusted upwards accordingly to give a disclosure-adjusted comparability index. In contrast, if the item exists but is not disclosed, the denominator, but not the numerator, of the C index is adjusted for non-disclosures to give a raw comparability index. For any accounting issue, the disclosure-adjusted C index will usually produce higher scores, and the raw C index lower scores, than the C index calculated by omitting non-disclosures entirely.

Archer and McLeay (1995) define the disclosure-adjusted comparability index as: 'Pairwise comparisons between companies using the same method and with and between (non-disclosing) companies/Maximum pairwise comparisons between all companies'. They define the raw comparability index as: 'Pairwise comparisons between companies using the same method/Maximum pairwise comparisons between all companies'.

We illustrate their rules with the between-country C index,[6] and extend them to the I index. In an Appendix, we suggest a rule for adjusting the H index for non-disclosures and indicate its relationship to van der Tas's C index.

In the algebraic example in Table 2, let $\text{ø}_a,..,\text{ø}_d$ be the non-disclosers in countries A,..,D respectively. The formulae for disclosure-adjusted and raw between-country C indices for 2, 3 and 4 country comparisons appear in Table 5, panels 1 and 2.

4.1. *Simulation results—between-country C index with non-disclosures*

For brevity, we restrict our simulation results for the non-disclosure case to the uniform data set. We simulated the disclosure-adjusted C index and the raw C index for two to 10 country comparisons, using the fourth accounting 'method' to represent non-disclosures. The results appear in Table 6, panels 1 and 2.

Like the unadjusted between-country C index in Table 4, both disclosure-adjusted and raw between-country C indices exhibit pronounced stability in their mean values and declining standard deviations as the number of countries compared increases. The disclosure-adjusted index tracks 0.625 and the raw index tracks 0.187, which are their 'expected values' if the number of companies choosing accounting method i (including the non-disclosers) in country m always equalled the expected value of 12.5. Unlike the unadjusted between-country C index, both disclosure-adjusted and raw indices exhibit little skewness and tend to be platykurtic. Comparing Tables 4 and 6, the ranking of the between-country C indices means is (i) disclosure-adjusted; (ii) unadjusted index; (iii) raw index, regardless of the number of countries compared.

4.2. *Disclosure-adjusted I index*

A disclosure-adjusted I index can be computed by modifying the formula for the unadjusted I index. The number of non-disclosers for country m are added to scores for each accounting method in country m in the numerator of the I index, and are

Table 5
Between-country C index with non-disclosures: formulae

Panel 1 *Countries*	*Disclosure-adjusted between-country C index*
A/B	$\frac{a_1b_1 + a_2b_2 + a_3b_3 + \text{ø}_a n_b + \text{ø}_b n_a + \text{ø}_a\text{ø}_b}{(n_a + \text{ø}_a)(n_b+\text{ø}_b)}$
A/B/C	$\frac{[a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3) + \text{ø}_a(n_b + n_c) + \text{ø}_b(n_a + n_c) + \text{ø}_c(n_a + n_b) + \text{ø}_a\text{ø}_b + \text{ø}_c(\text{ø}_a+\text{ø}_b)]}{[(n_a+\text{ø}_a)(n_b+\text{ø}_b) + (n_c + \text{ø}_c)(n_a + \text{ø}_a + n_b + \text{ø}_b)]}$
A/B/C/D	$\frac{[a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3) + d_1(a_1+b_1+c_1) + d_2(a_2+b_2+c_2) + d_3(a_3+b_3+c_3) + \text{ø}_a(n_b + n_c + n_d) + \text{ø}_b(n_a + n_c + n_d) + \text{ø}_c(n_a + n_b + n_d) + \text{ø}_d(n_a + n_b + n_c) + \text{ø}_a\text{ø}_b + \text{ø}_c(\text{ø}_a+\text{ø}_b) + \text{ø}_d(\text{ø}_a+\text{ø}_b+\text{ø}_c)]}{[(n_a+\text{ø}_a)(n_b+\text{ø}_b) + (n_c + \text{ø}_c)(n_a + \text{ø}_a + n_b + \text{ø}_b) + (n_d + \text{ø}_d)(n_a + \text{ø}_a + n_b + \text{ø}_b + n_c + \text{ø}_c)]}$
Panel 2 *Countries*	*Raw between-country C index*
A/B	$\frac{a_1b_1 + a_2b_2 + a_3b_3}{(n_a + \text{ø}_a)(n_b+\text{ø}_b)}$
A/B/C	$\frac{a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3)}{[(n_a + \text{ø}_a)(n_b + \text{ø}_b)] + [(n_c + \text{ø}_C)(n_a + \text{ø}_a + n_b + \text{ø}_b)]}$
A/B/C/D	$\frac{[a_1b_1 + a_2b_2 + a_3b_3 + c_1(a_1+b_1) + c_2(a_2+b_2) + c_3(a_3+b_3) + d_1(a_1+b_1+c_1) + d_2(a_2+b_2+c_2) + d_3(a_3+b_3+c_3)]}{[(n_a+\text{ø}_a)(n_b+\text{ø}_b) + (n_c + \text{ø}_c)(n_a + \text{ø}_a + n_b + \text{ø}_b) + (n_d + \text{ø}_d)(n_a + \text{ø}_a + n_b + \text{ø}_b + n_c + \text{ø}_c)]}$

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[6] We thank Stuart McLeay for his assistance in calculating the disclosure-adjusted and raw C indices and their derivatives.

Table 6
Between-country C index with non-disclosures (uniform data set)

Panel 1
Disclosure-adjusted between-country C index

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·623	0·632	0·633	0·629	0·627	0·627	0·627	0·626	0·625
s.d.	0·160	0·118	0·097	0·091	0·082	0·072	0·069	0·064	0·062
skewness	−0·489	−0·112	−0·013	0·039	0·068	−0·106	−0·146	−0·125	−0·173
kurtosis	0·051	0·015	−0·384	−0·649	−0·591	−0·442	0·463	−0·313	0·478
expected value	0·625	0·625	0·625	0·625	0·625	0·625	0·625	0·625	0·625

Panel 2
Raw between-country C index

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·182	0·187	0·187	0·186	0·187	0·187	0·186	0·186	0·187
s.d.	0·094	0·073	0·058	0·050	0·042	0·038	0·035	0·033	0·032
skewness	0·653	0·560	0·334	0·173	0·177	0·283	0·157	0·215	0·252
kurtosis	0·254	0·324	−0·185	−0·212	−0·285	−0·233	−0·305	−0·372	−0·576
expected value	0·187	0·187	0·187	0·187	0·187	0·187	0·187	0·187	0·187

added to the total number of companies in country m in the denominator. It is necessary to deduct a correction factor for double-counting non-disclosers in the numerator, because non-disclosers are added to the frequencies of each accounting method. The severity of double-counting increases with the number of accounting methods. The correction factor should reduce the numerator of the I index, be related to the number of accounting methods and the number of countries. For m countries, n accounting methods, the correction factor is $-(n\text{-}1)(\Pi \o_m)$. The disclosure-adjusted I index for two countries based on Table 2, panel 1 would be:

$$\frac{[(a_1+\phi_a)\,(b_1+\phi_b)+(a_2+\phi_a)\,(b_2+\phi_b)+(a_3+\phi_a)\,(b_3+\phi_b)-2\,(\phi_a\phi_b)]}{(n_a+\phi_a)\,(n_b+\phi_b)}$$

which simplifies to:

$$\frac{a_1b_1+a_2b_2+a_3b_3+\phi_a n_b+\phi_b n_a+\phi_a\phi_b}{(n_a+\phi_a)\,(n_b+\phi_b)}$$

and is the same as the two country disclosure-adjusted between-country C index.

Unfortunately, for more than two countries, Archer and McLeay's correction cannot be made to the disclosure-adjusted I index,[7] because the presence of the correction factor for non-disclosers in the numerator violates Archer and McLeay's condition that the I index should be the sum across accounting methods of their squared geometric means of the relative frequencies of each accounting method i across m countries. The correction factor is not a geometric mean. Mechanically applying Archer and McLeay's correction to the disclosure-adjusted I index can produce index values greater than 1. Consequently, we do not investigate the disclosure-adjusted I index further.

4.3. Raw I index

By analogy with the raw between-country C index, the raw I index for m countries is the numerator of the unadjusted I index for m countries divided by the product of the number of companies plus non-disclosers in each country 1, 2, ..., m. Using the example from Table 2, the raw I index for 2, 3 and 4 countries, with Archer and McLeay's correction, is shown in Table 7. The index in the two country case is the same as the raw between-country C index.

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[7] Van der Tas's correction can be made to the disclosure-adjusted I index.

Table 7
Raw I index with Archer and McLeay's correction

Countries	*Formulae*
A/B	$\frac{a_1b_1 + a_2b_2 + a_3b_3}{(n_a + \text{ø}_a)\ (n_b+\text{ø}_b)}$
A/B/C	$\frac{(a_1b_1c_1)^{2/3} + (a_2b_2c_2)^{2/3} + (a_3b_3c_3)^{2/3}}{[(n_a + \text{ø}_a)\ (n_b + \text{ø}_b)\ (n_c + \text{ø}_c)]^{2/3}}$
A/B/C/D	$\frac{(a_1b_1c_1d_1)^{2/4} + (a_2b_2c_2d_2)^{2/4} + c\ (a_3b_3c_3d_3)^{2/4}}{[(n_a+\text{ø}_a)\ (n_b+\text{ø}_b)\ (n_c + \text{ø}_c)\ (n_d + \text{ø}_d)]^{2/4}}$

4.4. Simulation results—the I index with non-disclosures

Table 8 shows simulation results for the raw I index with Archer and McLeay's correction. The means and standard deviations of the raw I index decline as more countries are compared, and there is no pronounced skewness or kurtosis. The means fall increasingly below the constant 'expected value' of 0.187.[8]

Figure 2 shows the means for the disclosure-adjusted and raw between-country C indices and the raw I index with Archer and McLeay's correction. For two-country comparisons the two raw indices are equal. If more than two countries are compared, the ranking of the indices is always (i) disclosure-adjusted between-country C index, (ii) raw between-country C index, (iii) raw between-country I index with Archer and McLeay's correction.

5. Discussion

This paper has demonstrated some comparative statistical properties of the I index and the between-country C index. In two country comparisons, the I index and the between-country C index are always equal, even when adjustment is made for non-disclosures. The result holds irrespective of the number of accounting methods in each country and the underlying distribution of companies across accounting methods.

For comparisons involving more than two countries, the corrected I index and the between-country C index diverge. Archer and McLeay's (1995), and not van der Tas's (1988), correction to the I index has been used because it is more consistent with van der Tas's original idea that the I index should be an analogue of the H index. Our simulation results, based on uniformly, bimodally and unimodally distributed data sets show that the means of Archer and McLeay's I index decrease for all data sets as more countries are compared. Standard deviations also fall for the uniform and bimodal data sets. There is pronounced skewness for seven or more countries with the unimodal data set, and pronounced kurtosis in the bimodal data set for seven or more countries, and in the unimodal data set for seven or eight countries. For all data sets, the index means fall increasingly be-

Table 8
Simulation results: raw I index with Archer and McLeay's correction (uniform data set)

	Number of countries								
	2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
mean	0·182	0·152	0·134	0·120	0·113	0·109	0·103	0·101	0·099
s.d.	0·094	0·075	0·058	0·049	0·042	0·038	0·035	0·033	0·032
skewness	0·653	0·788	0·576	0·627	0·604	0·766	0·675	0·601	0·600
kurtosis	0·254	0·616	0·222	0·295	0·113	0·400	0·503	0·199	0·326
expected value	0·187	0·187	0·187	0·187	0·187	0·187	0·187	0·187	0·187

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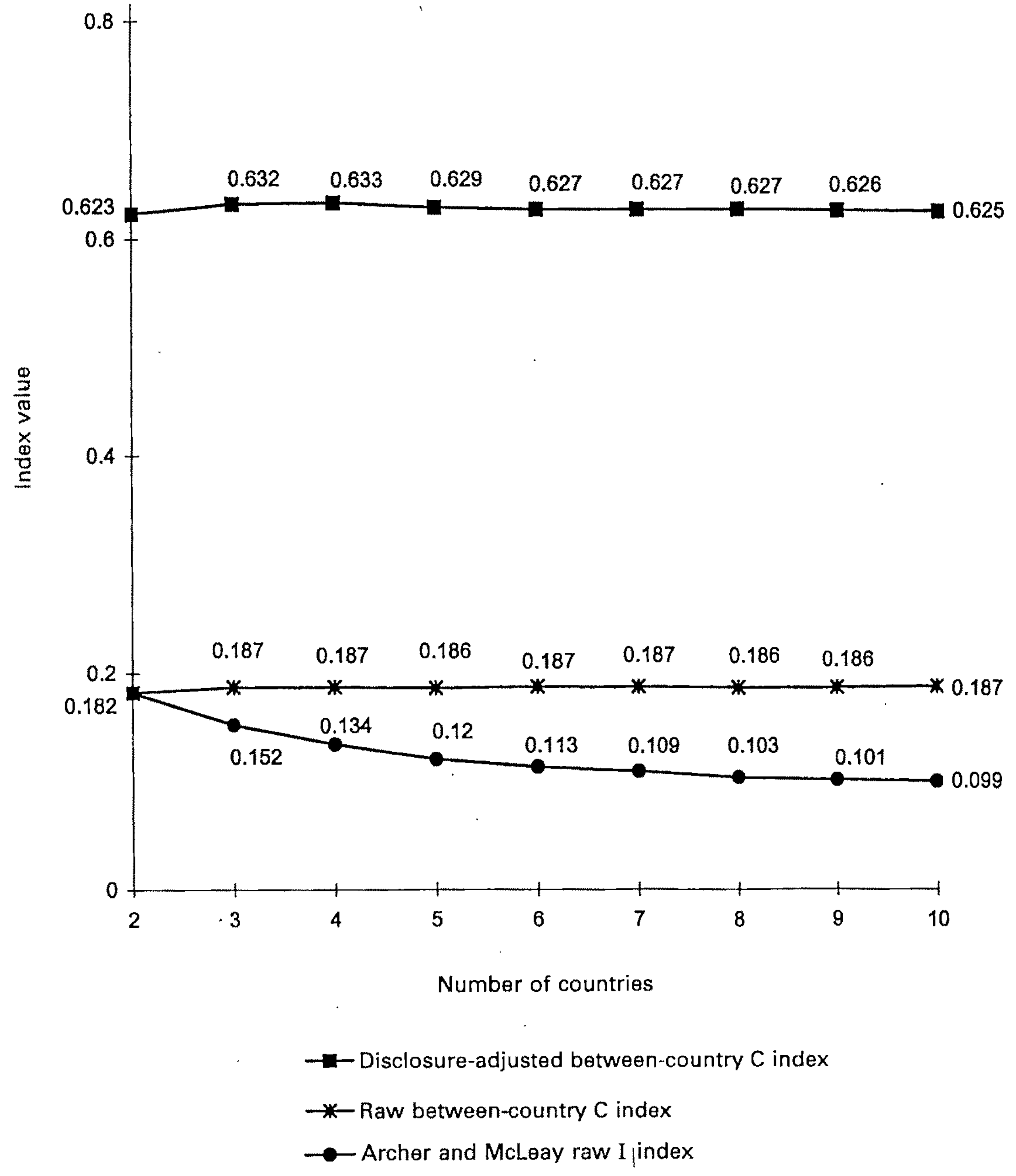
[8] In contrast, the means and standard deviations for the raw I indices *without* Archer and McLeay's correction, converge on zero as more countries are compared, and the means closely track their 'expected values'. Compared to the unadjusted I index in footnote 4, the rate of convergence for the means is faster for the raw I index. The mean raw I index without Archer and McLeay's correction commences from 0.182 for two countries and the mean for m countries is about 25% of the mean for m-1 countries. The raw I index without Archer and McLeay's correction tends to be increasingly positively skewed and leptokurtic as more countries are compared.

Figure 2
Corrected I index and between-country C index with non-disclosures (uniform data set)



low their 'expected values' (where all observations equal their expected values).

The means of the between-country C index closely approximate their 'expected values' for all country comparisons and usually exceed the corresponding mean I index with Archer and McLeay's correction. The between-country C index's 'expected value' is a constant for the uniform and bimodal data sets and slowly rises for the unimodal data set. Standard deviations fall as the number of countries increases. Skewness and kurtosis vary across data sets but tend to be greater than for the corrected I index as more countries are compared.

For the non-disclosure case, our results are only for the uniform data set. Techniques of dealing with non-disclosures developed by Archer and McLeay (1995) and Archer et al. (1995) for the C index and its derivatives are used. Two variants of the between-country C index are calculated: a disclosure-adjusted version used when non-disclosures are 'not applicable'; and a raw version used when the missing item is applicable to a firm but is not disclosed. Adjusting the between-country C index for non-disclosures tends to shift the mean by a constant, upwards for the disclosure-adjusted, and downwards for the raw, between-country C index. Both adjustments for non-disclosures remove the skewness and kurtosis exhibited by the unadjusted index. The disclosure-adjusted and raw between-country C indices closely track their 'expected values' which are constant for all countries.

We propose disclosure-adjusted and raw versions of the I index (and show in the Appendix the relationship between the H index and van der Tas's C index with non-disclosures). Unfortunately, Archer and McLeay's correction cannot be applied validly to the disclosure-adjusted I index, except in the two-country case. For this reason, the between-country C index is preferable if a disclosure-adjusted index is required. Adjusting for non-disclosures in the case of the raw I index tends to shift its distribution downwards. The means of the raw I index with Archer and McLeay's correction converge on zero as the number of countries increases, and fall increasingly below a constant 'expected value'. Standard deviations also fall and there is no marked skewness or kurtosis.

As Archer and McLeay (1995) noted and our results demonstrate, the assumption made about non-disclosures can have a substantial impact on the resultant harmony measures, especially if the number of non-disclosers is large. Deciding how to handle non-disclosures depends on the underlying facts and requires careful judgement. Using unadjusted indices, that is ignoring non-disclosures, would be reasonable if non-disclosures were relatively infrequent. If non-disclosures are 'not applicable', a dilemma can occur. Usually, the disclosure-adjusted between-country C index should be used. However, if the number of non-disclosers is very much larger than the number of disclosing firms, non-disclosers will dominate the index, which then approaches 1 and may mask the fact that considerable variation exists among disclosing firms. In that case, ignoring non-disclosures may be preferable in order to bring out variation among the disclosing firms. The raw indices should be used if the accounting policy applies to non-disclosers but they have not disclosed their accounting method.

In short, for the three data sets employed, the between-country C index exhibits more stability, either absolutely or in relation to its 'expected values', than does the corrected I index, even when both indices are adjusted for non-disclosures. The stability of the between-country C index is more consistent with the stability in the uniform and bimodal data sets, which each assigns an unchanging distribution of companies to accounting methods across countries. The unimodal data set is less stable than the other data sets, as the dominant accounting method changes across countries. Yet even here the between-country C index tracks its 'expected values' more closely than does the corrected I index. Where all countries have identical data distributions, it seems counterintuitive that the corrected I index shows decreasing harmony as the number of countries increases. For these reasons, the between-country C index may be superior to the I index.

An implication of the findings is that it would be a mistake to apply identical benchmarks to both indices, for example to say that 'considerable harmony' exists if the value of either index exceeds 0.85. For the same data set, the between-country C index is likely to indicate a higher level of harmony than the Archer and McLeay I index as the number of countries increases. Lower benchmarks should be set for the corrected I index if it is used.

Appendix

The H index and van der Tas's C index with non-disclosures

Let a_1, a_2 and a_3 be three accounting methods in a country,

$n = a_1 + a_2 + a_3$

$ø$ = the number of non-disclosers

Disclosure-adjusted H index is:

$$\frac{(a_1+\phi)^2+(a_2+\phi)^2+(a_3+\phi)^2-2\phi^2}{(n+\phi)^2}$$

$$=\frac{a_1{}^2+a_2{}^2+a_3{}^2+\phi^2+2\phi n}{(n+\phi)^2}$$

An adjustment must be made for double-counting non-disclosers. In any country with n accounting methods and ø non-disclosers, the correction for double counting in the numerator is $-(n-1)ø^2$.

The disclosure-adjusted van der Tas C index[9] is:

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[9] The number of pairs which can be chosen from n objects is 0.5n(n-1). Because van der Tas's C index is the ratio of pairs of comparable companies, the numerator and denominator of the index contains weightings of 0.5 which cancel out and for simplicity have been omitted earlier in the text. The cancellation cannot occur with the disclosure-adjusted van der Tas C index because its numerator contains $ø(a_1 + a_2 + a_3)$, the number of pairs formed between non-disclosers and all other companies, which does not require a 0.5 weighting. No 0.5 weightings are necessary with between-country C indices because of the condition that each pair member comes from a different country.

$$\frac{0.5[a^1\ (a^1-1)+a^2\ (a^2-1)+a^3\ (a^3-1)+\phi\ (\phi-1)]+\phi\ (a^1+a^2+a^3)}{0.5\ (n+\phi)\ (n+\phi-1)}$$

$$=\frac{a_1{}^2+a_2{}^2+a_3{}^2+\phi^2-(n+\phi)+2\phi n}{(n+\phi)\ (n+\phi-1)}$$

The relationship between the disclosure-adjusted H and van der Tas C indices is:

$$(n+\phi)^2\ H=(n+\phi)\ (n+\phi-1)\ C+(n+\phi)$$

$$H=\left(\frac{n+\phi-1}{n+\phi}\right)C+\frac{1}{n+\phi}$$

The raw H index is

$$\frac{a_1{}^2+a_2{}^2+a_3{}^2}{(n+\phi)^2}$$

while the raw van der Tas C index is:

$$\frac{a_1\ (a_1-1)+a_2(a_2-1)+a_3\ (a_3-1)}{(n+\phi)\ (n+\phi-1)}$$

$$=\frac{a_1{}^2+a_2{}^2+a_3{}^2-n}{(n+\phi)\ (n+\phi-1)}$$

The relationship between the two raw indices is:

$$H=\left(\frac{n+\phi-1}{n+\phi}\right)C+\frac{n}{(n+\phi)^2}$$

In both disclosure-adjusted and raw cases, the H and C indices converge as $n \to \infty$. If $ø = 0$, the relationship between H and C becomes that proposed originally by van der Tas (1988) for the unadjusted case, stated earlier.

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Book Reviews

Financial Reporting in the Pacific Asia Region. *Ronald Ma* (ed.). World Scientific/Singapore Institute of Management, Singapore, 1997. xvi + 503 pp.

The 1990s have witnessed a marked increase in the number of textbooks, treatises and handbooks on international accounting and financial reporting. The book under review, a recent entrant, is a compilation of essays on the culture, economy, business climate and financial reporting for a region encompassing East Asia, Southeast Asia and Australasia. Almost two-thirds of the volume is taken up by chapters on 13 countries: China, Japan, South Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, the Philippines, Thailand, Vietnam, Australia and New Zealand.

The volume was edited by Ronald Ma, a senior accounting scholar who has spent almost his entire career in the Pacific Asia region. He also wrote or co-authored four of the 19 chapters. Ma and 27 colleagues, seven of whom hold appointments at Griffith University, near Brisbane, where he is an honorary professor, have collaborated in presenting their more specialised essays against a large and rich canvas of Asian intellectual traditions, religions, politics, economics and commerce, tempered by streams of Western influence on Asian values and society.

Not surprisingly, China dominates the opening chapters on culture and the evolving commercial relations in the region. Chapters on the region's economy and on financial reporting and standard setting complete the broad overview. The reader is continually reminded of how these environmental factors help explain 'the economic growth in the region'. The book was written in 1995/96. Japan was then mired in a recession, but the rest of Asia's 'economic miracle' was in full cry. In the light of the pervasive economic meltdown in East and Southeast Asia that began in 1997, the authors would, I am sure, now frame their discussion differently. In particular, the cosiness between government and business and the laid-back approach to regulation, especially of bank reporting, would be treated more critically.

The country chapters are not weighed down by unnecessary detail, and they cover the essential matters that acquaint readers with the financial reporting climate. In each chapter, the differences between national accounting standards and International Accounting Standards (IASs) are effectively portrayed, thus providing a common benchmark against which to judge the adequacy of each country's norms and to enable comparisons among countries to be made. In an earlier chapter, Ma presents useful synopses of the 30 IASs issued by the middle of 1995.

If a revision is planned, I suggest that the authors of country chapters also be asked to comment on the differences brought out in the reconciliations to US GAAP of earnings and shareholders' equity mandated by the US Securities and Exchange Commission (e.g., see Weetman et al., 1998). As at 31 December 1997, between two and 30 companies in 10 of the 13 countries covered in the book were registered with the SEC, and, unless they use US GAAP, they must reconcile.

I would have liked to see more discussion in the country chapters of the influences on national standards and on the process for setting standards. Too much of the discussion in most of the country chapters is at the level of surface description, with little attempt to explain how controversies, scandals or embarrassments, public criticism, pressures from overseas, and lobbying by interested parties (such as preparers, regulators, auditors or user groups) have made a mark on particular enactments, regulatory reforms or the actual standards. In several of the countries, the literature already documents such incidents, and a few interviews with professional leaders or regulators could have unearthed others. In the chapter on Australia, for example, the authors report that, 'following vigorous debate on SAC 4, it was agreed...to remove the mandatory status of all SACs' (p. 448). A few sentences might have been used to explain why the debate over a single Statement (really a chorus of criticism from preparers) led to such a major reversal of standard-setting policy.

In the chapter on Japan, the authors could have presented vivid evidence of the impact of overseas pressures by explaining why, in the 1970s, Japan changed its policy 180 degrees from not allowing consolidated statements to requiring them. The dynamic of how change occurs is an integral part of the story.

It would also be helpful for the authors of country chapters to comment on their country's record of promoting improvement in financial reporting, especially the system for securing compliance with standards. If venturing criticism would be impolitic, then, as the author of the chapter on Australia does (p. 447), they might draw attention to evaluations made by others.

The book ends with a perceptive chapter by Ma and two others on international harmonisation in the region.

Comparisons will inevitably be made between this book and *Financial Reporting in the West Pacific Rim*, edited by T. E. Cooke and R. H. Parker (Routledge, 1994). The Ma book is much the better in bringing out the underlying cultural and economic variables, especially for the region as a whole. In the Cooke and Parker book, national standards were compared with IASC, UK or US standards, depending on the country's policy focus. Also, with international investors in mind, they included a sizeable section on taxation in each of the country chapters, while Ma's book focuses entirely on financial reporting. Some of the chapters in Ma (e.g., on the Philippines, Australia and New Zealand) are not as strong as those in Cooke and Parker, but Ma contains chapters on three countries not covered in Cooke and Parker (China, Indonesia and Vietnam). The chapter on China is especially well done. It might be noted that the authors of six of the country chapters in Ma acknowledge the corresponding chapters in Cooke and Parker in their references.

I have no doubt that this book will succeed in acquainting students and other interested readers with the content and climate of financial reporting in Pacific Asia. The broad overview chapters are nicely knitted in to each other and to most of the country chapters. The prose is conversational and not pedantic. Many tables and charts serve as effective complements to the narrative, and the level of factual accuracy is high. The absence of an index is unfortunate.

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Rice University Stephen A. Zeff

Keeping the Legacy Alive. *Robert Mednick.* Andersen Worldwide, Chicago, 1998, xiv + 164 pp.

Robert Mednick has been a major influence on auditing and professional developments during the past 20 years. His position in Andersens, latterly as managing partner of professional and regulatory matters, and his influence within the AICPA where he was chairman during 1996/97, have enabled him to pursue his vision of the profession's future. *Keeping the Legacy Alive* is a compendium of Mednick's 19 published articles and papers in chronological order. They provide an impressive testimony to his clear-sighted vision, persuasive argument and willingness to engage and organise in the pursuit of his ideas. I commend this publication to anyone who wants to understand and to appreciate the origins of today's 'audit/professional agenda', and the direction which is currently being taken by the profession worldwide. Only in relation to the organisation of the AICPA can the issues addressed be said to have a narrower US focus.

All of the papers are interesting and well written, but for an overview of professional issues I particularly enjoyed the one co-authored with academic Gary Previts and entitled 'The Scope of CPA Services: A View of the Future from the Perspective of a Century of Progress'. This paper, written in 1987, argues (p. 62) that the CPA firm needs to be perceived as an integrated firm of independent information professionals and that to this end there must be continued emphasis on independence as the cornerstone of the profession, demonstration of the synergy between attest and non-attest services, organisation of practice units across functional lines and a change in the education and testing of future CPAs. In significant part as a consequence of Mednick's awareness and influence, this agenda has subsequently been pursued by the professional firms and by the profession.

Mednick returns to many of these themes in his foreword, where he draws out from his writings five specific priorities for change. They are 1) expansion of the traditional audit function into new attest and assurance services; 2) reform of accountants' legal liability; 3) development of a new approach to establishing standards of auditor independence; 4) updating the licensure and regulation of the profession for twenty-first century practice and 5) transformation of today's CPA into the premier information professional of the twenty-first century. Each of these has been pioneered by Mednick and each has emerged as a fundamentally important issue.

Keeping the Legacy Alive has been published to mark Mednick's retirement from his firm. For those who inherit the legacy of professional leadership it is surely the transformation of the CPA into the premier information professional of the next century which demands the greatest attention. With reference to the information revolution, Mednick argues (p. 150) that 'the explosion of affordable information has placed a premium on professionals who can guide managers and others through the bewildering array of available data to find what they need to obtain and maintain a competitive advantage'. In other words, it is the ability of the accounting professional to assist and understand the client organisation's learning and knowledge processes which is key to the profession's future. A deeper understanding of the role of accounting and control in these processes represents a considerable challenge for the profession, and in my personal view is of more fundamental relevance than the broad sweep expansion of assurance services, which provides the focus for the AICPA's Special Committee on Assurance Services, and which has of course been another of Mednick's favoured themes. Mednick sees changes in the US liability regime away from joint and several liability (changes for which he campaigned vigorously), as necessary to allow the auditor to extend assurance services and to close the expectation gap. It will be most interesting to observe from hereon the extent to which liability reform fosters an extension of attestation in the public interest.

Mednick explains that he owes much to working with the strategic thinkers and giants of the accounting profession most of whom, like Mednick himself, have now retired. Who will accept the legacy of professional thought leadership? Is the profession still capable of producing strategic thinkers of Mednick's quality, articulation and influence? If not, why not? The editor of *Emerson Professional Services Review*, in eloquently profiling Mednick, argues (p. 161) that such men have always been in short supply. He states that 'I have learned that the combination of technical expertise, an intuitive sense of market forces, an understanding of public responsibility, a natural ability to think outside the box, and common sense are very rare qualities among professionals. From the more than 300,000 "Big 6" professionals worldwide, I estimate less than 10 combine these traits. And Bob Mednick is among the leaders of this very select group......' We must aim to produce rather more than 10! Indeed, ideally, are these the characteristics which should be exhibited by all the independent information professionals of Mednick's vision?

University of Edinburgh David Hatherly

Voluntary annual report disclosure by listed Dutch companies, 1945–1983. *Kees Camfferman.* Garland Publishing (Taylor & Francis). New York and London, 1997. ix + 360pp. £59.

Gerhard Mueller (1972) commented in the 1950s that financial reporting and disclosure in Europe were poor, particularly when compared to the openness in the US as a result of the Securities Acts in the 1930s. Events changed in the 1960s in Germany, France, the Nordic companies and the UK followed by change in the Netherlands, Spain and Italy in the 1970s. The underlying change was one of increased disclosure resulting primarily from changes in capital markets and the need to provide information for investors and the general public. An ancillary factor was the inability to agree on methods of income determination and valuation which promoted the need for disclosure.

For the Netherlands, encouragement was given to voluntary disclosure in the context of a line of development based on business economics. Before legislation in the 1970s, the country was regarded as being progressive and innovative in financial reporting (Scott, 1968) and it is in this context that the author focuses on the actual extent of voluntary disclosure in post-war Netherlands. Having identified the research question, a discussion of the concept of voluntary disclosure is undertaken which is defined as being 'non-mandatory disclosure' in annual reports. The empirical work is based on a sample of about 30% of companies listed on the Amsterdam Stock Exchange over the period 1945 to 1983, 1984 being the year of implementation of the EU Fourth Directive.

The longitudinal study considers 30 different disclosure elements with three key areas. First, at the national level, consideration is given to the development of financial reporting. Secondly, questions are raised concerning voluntary disclosure and association with different company characteristics. At the individual disclosure level, questions are raised relating to the characteristics of the process of introduction and dissemination.

Chapter two considers a variety of theoretical views on voluntary disclosure, particularly in relation to economics-based models of disclosure behaviour. The author considers signalling theory, arguing that firms with higher than average disclosure will have an incentive to disclose, thereby triggering a cascade-effect. From an agency perspective, disclosures assist monitoring but do not assist investment decision-making. The author indicates that the conclusions of such theories are consistent with the professional literature on disclosing, despite the fact that the theories ignore a number of factors that shape financial reporting. One such factor is that disclosure decisions are often made by groups rather than individuals. Thus, economic theories on disclosure are incomplete.

The following chapter considers voluntary financial reporting specifically in the Netherlands, and traces the rise and fall of financial reporting in terms of the 'Dutch systems' of financial reporting and reporting regulation. Dutch company law changed in response to the same forces or influences that motivated change in Germany and the UK, i.e. wider corporate accountability. However, corporate accountability in the Netherlands developed outside a legal regulatory framework, in contrast to that in Germany and the UK. For example, the 1928/29 Dutch Commercial Code revision left the contents of financial statements relatively unregulated, and it was not until the introduction of the Fourth Directive in 1988 that flexibility was significantly reduced.

Lack of accounting regulation in the Netherlands did not leave a huge vacuum since accountability was largely determined by the interaction between auditors and company managers. The latter proved willing to innovate, and improvements in disclosure over time resulted from voluntary action.

Chapter 4 provides a literature review of the main approaches to empirical disclosure research. Many of the key articles are recognised but the chapter is not comprehensive. In addition, the framework of analysis is considered and a relatively novel approach of 'diffusion of innovation' is considered, a process advanced by Rogers (1983). *Accounting and Business Research* published an article by Comiskey and Groves in 1972 which placed developments in research and development in the context of a diffusion process. Rogers (1983) defines the diffusion process as one in which an innovation is communicated through certain channels over time among members of a social system. In the context of disclosure, diffusion results from numerous individual adoption decisions, and the process is applied by Dr Camfferman to the change in disclosure in the Netherlands since the Second World War. In subsequent chapters, consideration is given to adopter characteristics, to the relationship between company characteristics and propensity to disclose, and then to the historical background of disclosure development in the Netherlands.

In terms of association between firm-specific factors and the extent of disclosure, size was again found to be the most important explanatory variable. This result was established based on a multiple regression model using step-wise—although some reviewers would argue that such an approach is unsound, arguing that its use demonstrates tenuous theoretical relationships that are assessed based on a 'fishing expedition'. Further, that the whole period (sub-periods are also considered) is considered without time as a dummy variable, implicitly assuming independence of disclosure over time when in reality disclosure is somewhat ritualised. In addition, based on an analysis of sub-periods, it appears that size becomes increasingly more important over time and dominates other explanatory variables. A further finding is that failing companies disclose significantly less information.

Another noticeable characteristic of the 1940s and 1950s is that additional disclosures appear before share issues, although this variable loses significance after 1970, mainly because of a lack of share issues. The research also establishes that newly listed companies model their disclosure on the average for the year in which they are listed, i.e. neither leaders nor laggards. Industry was not found to be significant, although trading companies did disclose less than manufacturing firms. The lack of significance may have been because the data had too many industries with too few companies.

The longitudinal study found that the 1970 Act on Annual Financial Statements was a significant influence on disclosure, with 1971 showing rapid response by increased disclosure. Anticipation of the implementation of the Act was very modest, whereas the reaction was dramatic. However, companies did change their disclosure practices regularly over the period from the Second World War to 1970. The 1970 Act codified a number of practices, including consolidations, and spurred further voluntary disclosures such as employee numbers, earnings per share, and geographical segmentation of operating income.

Additionally, large multinationals were usually at the forefront of disclosure although some domestic companies had comparable disclosure. This lends support to a notion, introduced in my 1989 paper (Cooke, 1989) on levels of disclosure in Sweden, that multinationals may establish a level of disclosure that is mimicked by domestic companies, i.e. a bandwagon effect. Thus, certain elements of accountability of domestic companies are improved through the existence of indigenous companies that become multinationals. For example, Dr Camfferman believes that the listing of Koninklijke Petroleum led to the introduction of EPS disclosures in the Netherlands.

The final chapter provides a summary and discussion as well as a consideration of the limitations of the research, and further suggestions. Limitations include a focus on listed companies, the selection of disclosure items, as well as measurement and analysis. As far as measurement and analysis is concerned, the main focus is univariate which is recognised as a problem because of disclosure interaction effects. Despite the limitations recognised by the author, this doctoral thesis contributes significantly to the disclosure literature and helps us understand developments in the Netherlands and the important change from voluntary to increased mandatory disclosures. The change results from important developments in international capital markets as well as changes introduced by the EU.

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University of Exeter T. E. Cooke

Aspects of the economic implications of accounting. *G. H. Lawson*. New York/London: Garland Publishing Inc., xviii + 367 pp.

This book represents the latest contribution by Gerry Lawson to an important research theme developed by the author over many years. The book contains both discussion of and empirical applications of the distinctive approach to financial reporting and financial analysis which has become his hallmark. This review focuses on Lawson's discussion of the conceptual merits of his system of cash flow/market value (CF-MV hereafter) accounting and its general relation to current capital market research in accounting with the aim of placing his work in a broader context and considering its implications for accounting research and policy. While I will make some reference to some of the general findings of the extensive empirical analysis of post-war US corporate performance contained in the book, there is much detailed analysis which cannot begin to be summarised in this brief review.

The early part of the book discusses in some detail conceptual arguments for the superiority of the CF-MV system of accounting (based on a capital market measure of income represented by the sum of entity cash flow and the change in entity market value) over the historic cost system of reporting. While many readers would find his arguments regarding the conceptual superiority of CF-MV financial performance measurement highly persuasive, many might be less convinced that such superiority merits a shift in financial reporting towards the CF-MV system. Indeed, the widespread acceptance of security returns and prices as benchmarks for assessing historic cost accounting data in market-based accounting research implies general acceptance of the importance of capital market measures of financial performance.

My view is that Lawson's support for a move towards CF-MV accounting is correct but that his justification for such a development, based on his CF-MV system's superior compliance with accounting recognition criteria and its greater representational faithfulness, needs to be augmented with persuasive arguments that it would lead to improved information flows and communication between management and investors—and hence improved economic decision-making and resource allocation.

The core of the book applies the now familiar tools of his CF-MV system to aggregate and individual US company data, focusing on changes in key financial variables over time. Lawson's analysis focuses in particular on (i) comparison of historical cost income-based financial ratios with corresponding ratios based on the entity cash flow concept and (ii) comparison of CF-MV economic performance with historic cost income performance.

The former empirical evidence highlights the widespread tendency for pre-tax historic cost entity income to exceed pre-tax entity cash flow, a finding consistent with capital expenditure in excess of accounting depreciation and increasing working capital investment resulting from long-run economic growth. Lawson's analysis is interesting in indicating the potential financing problems that might arise when taxation and dividend distribution decisions are based on accrual figures, and he provides a strong case for using entity cash flow as the basis for interest and dividend cover ratios for risk analysis purposes.

However, while I can accept Lawson's view that large-scale debt financing associated with low post-tax entity cash flow interest and dividend cover may be relevant for risk analysis, it can also be reasonably argued that in many such cases the new debt is financing a portion of current capital expenditure with positive future cash flow generating potential and that the interpretation of such debt as financing taxation, interest and dividend cash outflows is not entirely appropriate. The interpretation of Lawson's cash flow ratios is therefore not without its difficulties and may be improved in conjunction with the use of accrual-based ratios and current value information (including capital market security values as indeed suggested by Lawson's broader CF-MV approach).

The second major aspect of his empirical analysis provides some interesting results on the relationship between entity historic cost earnings and entity market returns. Given that the author presents this analysis without reference to previous capital market research in accounting, I also offer some comments on this link here. To summarise briefly; the results indicate much greater intertemporal variation in entity market returns than entity (historic cost) ROI, highlighting both the greater variability of cash flows over accrual flows and the impact of changing expectations on market returns. In addition, the evidence provides support for a statistically significant contemporaneous association between entity market returns and ROI over time (and some evidence that entity returns both lead and lag ROI). An interesting feature of Lawson's empirical analysis here is that it has close similarities to much capital market research on the information content of historic cost earnings, with the notable difference that he uses an entity measure rather than a shareholder measure of market returns (and the methodological difference that he carries out time-series as opposed to cross-section analysis of the relationship between returns and accounting earnings). But in relation to the interpretation of the empirical findings he differs substantially from many other capital researchers, the Lawson perspective emphasising the lack of a 'strong' association between entity market returns and entity accounting earnings (and, more generally, differences between the statistical properties of market returns and accounting earnings) rather than the existence of a statistically significant positive association between returns and accounting earnings. Although such interpretative issues are not easily resolved, Lawson's perspective raises legitimate concerns in relation to the policy implications of market-based research for the future direction of financial reporting.

In conclusion, I found this book an interesting further contribution to the CF-MV framework which Gerry Lawson has developed over the years. It raises many interesting issues and provides a detailed analysis of the data. While there are aspects of his analysis which I feel require further development and clarification—for example, discussion at the beginning of the book appears to view CF-MV accounting as an addition to accrual accounting, while later discussion talks of abandoning accrual measures—the book provides useful further support for the view that existing financial reporting arrangements for investors can be substantially improved through the incorporation of CF-MV data. This is an important issue which the author has done a great deal to address in this and other studies, and which deserves greater attention from accounting researchers and policy-makers.

Imperial College Management School Colin Clubb

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Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

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Discretionary write-downs, write-offs, and other restructuring provisions: a signalling approach

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Accounting and Business Research, Vol. 29. No. 2. pp. 95–108, 1999.

The market reaction to auditor resignations

John Dunn, David Hillier and Andrew P. Marshall*

Abstract—Under UK company law, external auditors who resign must warn shareholders and creditors of any matter that ought to be brought to their attention. Auditor resignations and the subsequent change in auditor are informative corporate events. Resignation from office is likely to be a costly signal for the audit firm, particularly when the client is a quoted company. Our analysis of daily data suggests that there is a negative reaction to the auditor resignation on the date of the resignation letter, even though very few auditors indicate there were problems of which the shareholders and creditors should be made aware. This provides backing for the statutory rules on disclosure of the auditor resignation. We also find that the extent of the market reaction on the day of the resignation is related to the size of the resigning audit firm.

1. Introduction

Auditor change, including resignations, removals and the selection of a new auditor, has been the focus of attention of academics, practitioners and regulators for a number of years. It is an important corporate event dealing with the fundamental relationships between an auditor and management and an auditor and shareholders. These relationships are linked to questions on the independence of the auditor and the auditor's legal responsibilities to shareholders.

Previous studies, based on US data, have considered factors that influence auditor changes,[1] the selection process of a new auditor[2] and the market reaction to the announcement of an auditor change.[3] There has been some recent UK evidence on auditor choice by Beattie and Fearnley (1995).[4] This paper is intended to provide evidence on the information content of auditor resignations by examining the market reaction to auditor-instigated changes, an area of interest to both regulators and practitioners. We also consider possible factors suggested by the auditing literature and by studies of audit methodology which might explain differential market reactions. Its contribution is facilitated by a unique database that allows us to focus on the specific event of auditor resignation, rather than dealing with all auditor changes, some of which are initiated by the client and some by the auditors. We feel that the market reaction to voluntary and involuntary changes may be different and have distinct implications for regulators. UK legislation makes it possible for an auditor and client to part company by mutual consent and with minimal disruption by appointing another firm at the annual general meeting. A resignation might, therefore, indicate a serious breakdown in the relationship between the auditor and management and this could prove unsettling for the market.

We anticipate that the market would view the resignation of an auditor negatively because it is costly for an auditor to resign without some compelling reason. If an audit firm resigns from office then it will forego the discounted value of the fu-

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[1] The following reasons have been suggested as motivations for companies to change auditors; changes in company management (Burton and Roberts 1967), the need for a prestigious auditor when issuing securities or in an attempt to correct a poor image of the company caused by poor performance (Carpenter and Strawser 1971 and Schwartz and Menon 1985), disagreements over financial reporting procedures (Chow and Rice 1982), the need for additional or more effective service (Titman and Trueman 1986) and the reduction of audit fees (Simon and Francis 1988). See Williams (1988) for a fuller discussion.

[2] Eichenseher and Shields (1983) found that the two most important factors in auditor selection are auditor fees and the auditor's responsiveness to company needs. Auditors who favoured an accounting method consistent with the management's favoured method were found to be popular in DeAngelo's (1982) study of the oil and gas industry.

[3] See for example, Fried and Schiff (1981), Nichols and Smith (1983), Smith (1988), Eichenseher et al. (1989), Johnson and Lys (1990), Klock (1994) and Davidson and Gribbin (1995). Further information on the findings of these papers is given in Section 3.

[4] Beattie and Fearnley (1995) surveyed 210 UK listed companies on the reasons for auditor changes. They found that the four most popular reasons were reputation and quality, acceptability to third parties, value for money and ability to provide non-audit service.

ture audit fees (net of costs) and possibly fees from other services provided to the company. The auditor is only likely to sacrifice these revenues because of concerns about being associated with the company. These could be professional concerns, such as doubts about the quality of the accounting information which management plans to publish, or commercial concerns, such as the risk of loss of reputation through being associated with a failing company (or in come cases the possibility of litigation).

It is also costly if directors decide to remove auditors. It is difficult to measure the costs to the company of an auditor resignation. However, there could be an increase in the audit fee charged by the new auditor, and there is the undoubted cost in terms of time and effort involved in finding a replacement auditor. The selection and initial briefing of a new firm is likely to be time-consuming for the board and is unlikely to be taken lightly. The new auditor will also have to incur significant initial costs in order to plan its first audit and to document systems and controls, although these costs may not be passed on immediately to the client company if the auditor views them as an investment in order to obtain the assignment.[5]

Despite these costs, companies do remove their auditors. An auditor may pre-empt their removal from office by resigning. The auditor could, for example, face dismissal and might resign in order to save face and protect its reputation. It is, however, reasonable to suggest that situations in which the auditor could be 'forced' to resign will be due to a problem with either the company or with the audit firm. Problems with the company could include a severe breakdown in the relationship with the directors or an inherent risk arising from the company's operations, such as doubts about its going concern status. In such a case the resignation would still indicate a serious problem with the company's financial statements or its underlying commercial position.[6] Even where management instigates a resignation, it is still a costly signal for both sides and is likely to be taken seriously.

Another possibility is that the auditor is to be removed from office because of some dissatisfaction with the quality or cost of the work being done. It is, however, unlikely that the company would permit its reputation to be tarnished by an auditor who resigned in order to avoid dismissal under these circumstances. The directors would have an incentive to ensure that the markets were made aware of the reasons for the auditor's departure. While this latter type of resignation cannot be distinguished in our sample, we consider that competition between audit firms will limit the extent to which they are liable to dismissal for inefficiency. This is particularly true with respect to firms large enough to act for listed companies. We do not, therefore, believe that our sample, which is confined to listed companies, will have been significantly biased in this way. It is also worth noting that none of the resignations in our sample came on the date of a company general meeting or in the month following. There is, therefore, no strong reason to believe that any of these resignations were tendered at the shareholders' request.

The Companies Act 1985 requires an auditor who ceases to hold office for any reason to warn shareholders and creditors of any matters connected with the resignation which ought to be brought to their attention.[7] This legislation is a significant component of the statutory provisions governing auditor independence and communication between auditors and the users of financial statements. Therefore, this study will consider the current effectiveness of the legislation in providing information to users and the market on the circumstances surrounding the resignation.

The evidence indicates that the market views the resignation negatively and that it responds on the day of the resignation. We also carry out an analysis of the share price movements on the day of the resignation. In this analysis we consider the size of the resigning audit firm, whether the previous audit report was qualified and accounting measures of audit risk, financial risk and growth. We find that the only significant element on the day of the resignations is the size of the resigning audit firm.

The remainder of the paper is organised as follows. Section 2 outlines the regulations that govern auditor resignations in the UK. Section 3 summarises the prior literature. Sections 4, 5 and 6 deal with the sample, research method and key findings respectively. Section 7 describes the findings of an analysis of the factors influencing the key findings. Section 8 summarises our conclusions.

2. UK legislation governing auditor resignations

UK company law requires that an auditor who ceases to hold office for any reason must deposit at the company's registered office a statement of any circumstances relating to the resignation which should be brought to the attention of the members or creditors of the company (Section 394 of the Companies Act 1985).[8] If there are no such circumstances then it is necessary to deposit a statement to this effect. If the statement by the auditor describes circumstances that should be communicated to shareholders or creditors, then the company must normally send a copy within 14 days of receipt to everyone who is entitled to receive a copy of the annual report. The company can only be excused from circularising such a statement by application to the court on the grounds that the auditor is attempting to secure needless publicity for a defamatory matter. Regardless of whether the statement contains any matters requiring the attention of shareholders and creditors, the auditor is required to deposit a copy of the letter with the Registrar of Companies. The letter then becomes available for inspection on request. Any failure by the auditor to comply with these provisions is a criminal offence, punishable by a fine.

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[5] DeAngelo (1981) argues that the cost of an auditor change must be material because of the low rate of change.

[6] The markets would probably be indifferent to the fact that the auditor's resignation had been a response to management's intentions.

[7] Despite the statutory duty of auditors to warn shareholders and creditors very few such warnings are attached to resignation letters. Dunn et al. (1994) found only 2.5% of resignation letters contained any information to be brought to the attention of shareholders and creditors (from a sample of 792 resignation letters). As far as the authors are aware, there have never been any prosecutions following on from a failure to make some issue public.

Perhaps, surprisingly, given the detailed nature of these regulations and the sanctions for non-compliance, the Companies Act does not provide any guidance as to the nature of matters that ought to be reported. Also, despite the potential importance of this information, there is no formal mechanism, apart from the filing of the latter at Companies House, for publicising the resignation.[9] For example, the London Stock Exchange does not require any disclosure of a change of auditor. It has been suggested in discussions with some auditees that they would make a point of briefing analysts or institutional shareholders of any resignation. Otherwise market makers and other interested parties may therefore have to obtain this information from the companies themselves, the financial press or from the details lodged with the Registrar of Companies at Companies House.

These regulations are potentially important in terms of the agency relationships between the shareholders and the auditors, and between the shareholders and the company directors. It appears that the legislation is intended to make it costly to resign without revealing the truth behind the resignation. The intention is twofold: directors cannot force an uncooperative auditor out of office without such behaviour being reported in the resignation statement to shareholders and lenders, and the auditor cannot escape from an embarrassing situation (such as the discovery of management fraud) by quietly resigning and leaving the matter undisclosed.

3. Prior literature

Previous empirical studies have not distinguished between client-initiated auditor changes and auditor initiated changes. They have not focused on the specific event of auditor resignations as resignations tend not to be flagged in the on-line databases that are used in event studies. This study was only made possible by the commissioning of a special search from Companies House, funded by a grant from the Institute of Chartered Accountants in England and Wales (ICAEW) Research Board.

Most studies hypothesise a negative market reaction to a change in auditor.[10] Some authors suggest that an auditor change would signal new unfavourable information about the company. Others use agency relationships to argue that if management changes its auditors the new auditor may be seen to be less critical and the investors' confidence in auditor independence will weaken. Agency theory has also been used to suggest that the managers' objective in changing the auditor may be to maximise their utility rather than the wealth of the shareholders. For instance, Davidson and Gribbin (1995) argue that the stock market views the auditor change negatively, as it interprets changes in auditors to be a management entrenching event.

The empirical evidence of the stock market reaction to auditor changes in the US has been mixed. This is partly attributable to the small number of observations in previous studies and, we suggest, because they have not distinguished between resignations and dismissals. The results could also be confounded by the fact that some auditor changes could be for positive reasons, such as a mutually desirable switch in response to a company outgrowing its auditor, or a change motivated by a desire to appoint a firm which is more efficient or more credible.

Fried and Schiff (1981) reported a negative market reaction to 48 auditor changes in the period 1972 to 1975 but could not explain what had motivated this reaction. Davidson and Gribbin (1995) considered 36 auditor changes in the period 1983 to 1993 and found that the announcement of an auditor change was accompanied by a negative abnormal return. As a result, they argued that the market is suspicious of managers' motives in auditor changes. Contrary evidence is presented by Nichols and Smith (1983), who found no significant market reaction to 51 auditor changes from 1973 to 1979. Similarly, in the most comprehensive study to date, Johnson and Lys (1990) considered 194 voluntary auditor changes between 1975 and 1978 and found that there was an 'absence of systematic abnormal returns' (p. 306) around the event date, concluding that auditor changes provided little information relevant to the pricing of securities.

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[8] The importance of the legislation has been underlined by the fact that the 1985 Companies Act extended these reporting requirements to all auditors who leave office, regardless of whether this was due to resignation or removal by the company.

[9] Clearly, if the auditor was bringing a problem to the attention of the shareholders and creditors the letter would have to be circularised.

[10] A dissenting view is provided by Johnson and Lys (1990) who argue that auditor changes should be motivated by management's desire to maximise residual company value, although they seem to assume that the auditor change is not the first signal that the company is 'underperforming'.

The present study is based on a sample of events where the auditors involved explicitly state that they are resigning office. This gives it the potential to provide a clearer insight into the market's reaction to auditor changes where there is a high probability that here has been a breakdown in the relationship between the auditor and management.

4. Sample

The Registrar of Companies at Companies House provided a listing of all companies whose auditor had lodged a statement in respect of cessation of office during the period approximately 1988–1993. These were filtered to isolate only public companies, of which there were 793. A microfiche was obtained from Companies House for each of these. The fiches were examined to identify events of interest before and after the resignation date, in particular the content of the statement concerning matters to be brought to the attention of shareholders and creditors, the identities of the auditors before the resignation and the last audit report before the resignation.

The list contained 218 companies that were quoted on the London Stock Exchange. A number of these had to be excluded from the study because of gaps in the returns data. The steps leading to the identification of the final sample of 88 companies are described in Table 1.

4.1. Profile of the auditor resignation sample

Table 2 lists some of the descriptive statistics for our sample. Panel A indicates that around 20% of the companies in the sample no longer traded (in the one year period following the resignation) because of mergers, take-overs or bankruptcy. Panel B shows that the sample is not biased towards any one industry sector. Panel C indicates that the resignations are not unduly clustered in any period. Most of our resignations are in the years 1990, 1991, and 1992, but there are no significant numbers in any one year. A monthly analysis shows that resignations are most common in March, September and October. Generally, the resignations tended to be in the months prior to the company accounting year end, which could indicate that auditors tend to resign before undertaking a great deal of detailed fieldwork in the year of resignation. An analysis of the timing of resignations relative to other company specific news indicated that there was no significant clustering of the resignations around merger/take-over announcements, earnings announcements or annual general meetings.

To provide more information on the descriptive characteristics of our test resignation sample we constructed a matched sample, based on industry grouping, size of company and the current status of the company.[11] Fourteen (16%) of the 88 companies in our sample had an audit qualification prior to the resignation (Table 2, panel D). This seems high in comparison to our control sample, where there were only three qualifications in the control sample.[12] The auditor resignations were approximately evenly split between Big 6 and non-Big 6 firms. Of the 88 resigning auditors, 43 were from Big 6 firms and 45 from non-Big 6 firms. However, 66 (75%) of the replacement auditors were Big 6 firms. After replacement, the composi-

Table 1
Final sample of auditor resignations for listed companies in the period 1988–1993

Initial Sample of Companies Listed on London Stock Exchange	218
Less - Incomplete Record on Database	18
Less - Liquidated or Dissolved Companies or Auditor Removals	46
Less - Companies with Unobtainable Return Series	19
Less - Companies with An Inadequate Number of Returns	47
Final Sample	**88**

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[11] The matched sample was constructed from the Extel Financial database using their industry classifications, the size of their total assets plus or minus 5% at the time of the resignation and the current status of the company (whether live or extinct).

[12] Note that the proportion of companies that received qualified reports is high in relation to the incidence of qualifications in general. For the period of the sample the average percentage of companies that received an audit qualification or specific comment was only 4% of the 300 companies surveyed (The ICAEW surveys of Financial Reporting from 1988 to 1993). It seems that a qualification indicates that the auditor is more likely to resign.

tion of Big 6 auditors for the test sample (75%) is similar to the control sample 76% (67 of 88).

A comparison of the test sample with the control sample in terms of the descriptive variables used in our regressions in Section 7 suggests that there were no significant differences, apart from audit risk (which is measured by dividing the audit fee by turnover; see Table 2, panel G).[13]

5. Research approach

The central question for this study is whether the resignation letter signals some new information to the market. The first part of our analysis is an event study of the market reaction to the resignation for the full sample. Then, following the different findings in the US studies, we consider the market reaction to small and large companies separately. In the second part of our analysis we use regressions to consider various factors that may influence the market reaction to the resignation. Some of these reasons are based on the features of the resigning auditor and some on the prior financial performance of the company.

5.1. Overall market reaction

A priori, we would suggest that the market might interpret the auditor's resignation as signalling unfavourable information about the company. This is despite the fact that the vast majority of the statements deposited by the departing auditor were to the effect that there were no circumstances to be brought to the attention of shareholders or creditors.

Only four of the outgoing auditors actually identified in their resignation letters any matters that ought to be circularised. The four included concerns about: significant fees owed to the auditor, management's refusal to provide information, management's refusal to withdraw misleading statements and a conflict of interest arising because the company alleged negligence in the audit of a subsidiary. This is potentially significant in the light of our hypothesis, because it suggests that any negative market reaction to the auditor resignation is in response to the resignation itself and not to any specific disclosures at the time by the auditor. If the market does not believe that all matters which should be brought to the attention of the members or creditors are being disclosed, then some doubt is cast on the effectiveness of the legislation.

Hypothesis 1

> $H1_a$: There is a negative market reaction to the auditor's resignation.

5.2. Market reaction to auditor resignation by size of company

Eichenseher et al. (1989) suggest that the effects of company size might explain the different results from US studies of the market reaction to auditor change. For instance, Nichols and Smith (1983) considered mainly large companies while Fried and Schiff's (1981) sample contained a greater proportion of smaller companies. Eichenseher et al. (1989) considered mostly smaller companies and found a negative market reaction to 87 auditor changes between 1980 and 1982. Consequently, the US evidence on the market reaction to auditor changes does not give a clear picture of any impact on company market value; and the results may be influenced by company size. We deal with this issue by ranking the companies in our sample by size and then splitting the sample in two.

Hypothesis 2

> $H2_a$: There is a different market reaction to the auditor's resignation for small and large companies.

5.3. The model

We first examine the market reaction to auditor resignations using an event study methodology based on daily returns. Abnormal returns are assumed to be derived from the market-adjusted model:

$$UAR_{it} = R_{it} - R_{mt} \quad (1)$$

The use of this model over the more common market model is justified by the possibly severe problem of thin trading.[14] One possible approach (to control for thin trading) is to incorporate lead and lagged market terms in the return-generating model.[15] However, Hillier and Yadav (1997) have shown that such an adjustment can at worst lead

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[13] The companies in our sample are generally small, with a mean market value of £235.29m and a median market value of £16.98m. Also, only 10 of our companies were above the median market value of all companies listed on the London Stock Exchange in the year of the auditor's resignation.

[14] Thin trading may be a problem affecting many of the companies in our sample. Trading on the London Stock Exchange is concentrated in the largest 30% of companies with volume tailing off rapidly for smaller firms. Since daily data was used, thin trading becomes a serious problem for our resignation sample. Our beta estimates are substantially biased towards zero. This causes big differences between the market and the market adjusted models. From our tests we found that the market model performed poorly with the beta coefficient being biased downward for most firms. We also considered the mean adjusted model which gives fairly similar results to the market-adjusted model as the reaction on the day of the resignation was still significantly negative.

[15] See Scholes and Williams (1977) and Dimson (1979) for more details.

Table 2
Profile of the resignation sample

Panel A - Current status of resignation sample

	Number of Companies
Live	70
Extinct - Merger/take-over	7
Extinct - Bankruptcy	11
Final sample	**88**

Panel B - Breakdown of final and control samples into industry groupings

	Number of Companies
Financials	12
Services	16
Engineering	10
Manufacturing	16
Property	8
Retail	14
Other	12
Final sample	**88**

Note: Industries allocated according to London Share Price Database/Extel Financial Company Research industry classifications.

Panel C - Timing of auditor resignation

Year	*Number*	*Month*	*Number*
1988	2	January	7
1989	8	February	6
1990	19	March	11
1991	25	April	8
1992	27	May	7
1993	5	June	5
1994	2	July	4
Total	**88**	August	2
		September	10
		October	15
		November	4
		December	9
		Total	**88**

Panel D - Resigning auditor, nature of audit report pre-resignation and replacement auditor

	Test sample	*Control sample*
Resigning auditor current auditor		
Big 6	43	67*
Non-Big 6	45	21*
Nature of audit report–pre-resignation		
Unqualified	74	85**
Qualified	14	3**
Replacement auditor		
Big 6 to Big 6	33	N/A
Big 6 to non-Big 6	10	N/A
Non-Big 6 to Big 6	33	N/A
Non-Big 6 to non-Big 6	12	N/A

*We list the current auditor.
**We considered the audit opinion in the most recent accounts of the control company.

Table 2 (cont.)

Panel E - Descriptive statistics of test sample

	Mean	*Median*	*Standard deviation*	*Minimum*	*Maximum*
Growth					
Change in fixed assets (£000s)	32,199	0.00	386,609	−1,064,300	2,619,400
Financial risk					
Debt/equity	1.32	0.55	2.73	0.05	16.60
Audit risk					
Audit fees/turnover	0.0031	0.0019	0.0036	0.0002	0.0195

Panel F - Descriptive statistics of control sample

	Mean	*Median*	*Standard deviation*	*Minimum*	*Maximum*
Growth					
Change in fixed assets (£000's)	7,118	0.00	247,784	−780,043	1,461,000
Financial risk					
Debt/equity	0.61	0.50	0.57	0.01	2.34
Audit risk					
Audit fees/turnover	0.0021	0.0012	0.0031	0.0003	0.0209

Panel G - Wilcoxon Signed Ranks Test statistics for difference in means

H_0: $\mu_{Test} = \mu_{Control}$	*Test statistic*
Growth in fixed assets	0.01
Financial risk	1.25
Audit risk	2.16*

*Statistically significant

to a mis-specification and bias in the model prediction errors and at best reduce the efficiency of the methodology.

The event period for our analysis ranges from 20 days before the event date to 20 days after the event date.[16] Abnormal return test statistics are described in Appendix 1. Our event date is the date on the letters of resignation, which in all cases was the date of the formal resignation.

6. Results

The abnormal return (AAR) and the buy and hold abnormal returns (BHAR) for all companies in the sample for the period t−20 days to t+20 days are shown in Table 3. The AAR (−0.3694%) on the day of the resignation (day 0) is significantly negative (t-statistic = −2.32, significant at the 99% level), which suggests that there is an adverse market reaction to the auditor resignation. Although the abnormal returns are predominantly negative for all days in the event period, they are mostly not significantly negative. Consequently, the significant negative market reaction is an indication that the market views the auditor resignation negatively and the resignation letter provides information to the market. This provides evidence in support of our hypothesis 1.

Thus the resignation itself is seen as signalling negative information, despite the fact the market would not appear to be fully aware of the circumstances surrounding each resignation. Pre and post resignation, the BHAR was insignificantly negative (for the period −20 to −1 the BHAR is −2.21%; for the period +1 to +20 it is −4.18%).[17]

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[16] We also used the market-adjusted model to avoid some of the problems related to the estimation period of the market model. Nonetheless, an estimation period is used to calculate the estimated standard deviation of each security's abnormal returns. Sensitivity analysis of various estimation period lengths for the standard deviation estimate resulted in no significant effect on the event period t-statistics.

[17] When we considered a longer event period prior to the resignation −120 to −1 we also found that the BHAR were insignificantly negative (BHAR −4.9023, t-statistic −1.21). This is contrary to Johnson and Lys (1990) who found that companies who changed auditor experienced lower share price performance in the pre-change period than a matched sample who did not change. One possible reason for the differences is

For the full period t−20 to t+20, the BHAR was −4.18%, which is statistically insignificant at the 5% level of significance.[18] However, when we considered a longer event period (−120 to +120) there was a statistically significant BHAR of −13.7% (significant at the 10% level). We would therefore suggest that companies which experience an auditor resignation perform poorly despite the fact that few auditors choose to indicate there were problems of which the shareholders and creditors should be made aware. This finding raises some important issues concerning the effectiveness of current disclosure requirements.

As a further test, we carried out an event study on our matched control sample of companies. For each control company, the auditor resignation date for the corresponding test company was used as the event date. Using the same methodology we found that, in contrast to the test sample of firms, no abnormal performance was experienced by the control sample. This lends additional support to our earlier results that the market reacts unfavourably to the information contained in the auditor resignation.

When the sample was divided by size of company, as suggested by hypothesis 2, we found a significant negative reaction to the announcement of our large company sample on the day of the announcement. The reaction was also negative for the small company sample, although it was not statistically significant. A Wilcoxon-Mann-Whitney test shows no significant difference in the performance of large or small firms as a result of the audit resignation, rejecting hypothesis 2. Also, over the next 20 days, the small size company sample experienced significant negative abnormal performance. This may indicate greater market inefficiencies in small, illiquid firms.[19] That is, both sets of companies (small and large) are affected by the auditor resignation; but, whereas large firms react to the announcement on the day of the event, the impact of the news is gradually impounded into small firms' prices. When we considered longer event periods the performance of both groups, large and small, was very similar. For example, the −120 to +120 days BHAR were −12.66% and −14.84% respectively. In both cases, particularly with the small company sample, significant negative market reactions occurred at least two days prior to the resignation.

Various US studies on auditor change have examined the characteristics of the replacement auditor. Unfortunately, we cannot examine the effect of the size of the replacement auditor in our sample because we do not have the dates of the announcement of the new auditor. This may not be the same as the date of the auditor resignation. However, as a robustness check, we also assume the replacement auditor was known at the date of the resignation, to test for differences in the market reaction. Due to the small numbers in some of these categories we split the sample into two. Sample 1 consists of those companies where the auditor resigned and the new auditor was a Big 6 auditor (66 companies); see Table 2, panel D. Sample 2 consists of those companies where the auditor resigned and the new auditor was not a Big 6 auditor (22 companies). This did not change the overall pattern of results with our full sample pre and post resignation. However, although sample 1 does have a significant negative reaction on the date of the resignation letter (AAR = −0.383, t-statistic = −2.30), sample 2 has an insignificant positive reaction on the date of the resignation letter (AAR = 0.213, t-statistic = 0.39). This is puzzling given that we find little difference in the overall pattern; the fact that we did not find any cases where the replacement auditor was announced on the date of the resignation letter.

7. Factors affecting reaction

Having established a negative reaction on average to an auditor resignation, we attempted to identify the factors which might explain differential effects. This was done by running regressions with explanatory variables suggested by the auditing literature or by studies of audit methodology.

7.1. Size of resigning auditor

The market may interpret the signal from the resignation differently if the auditor is a Big 6 firm. Agency studies often use the decision to employ a Big 6 firm as an attempt to signal that a company's financial statements are more dependable (e.g., Carpenter and Strawser 1971 and Francis and Wilson 1988). The resignation of a Big 6 auditor may be viewed as a more significant event than the resignation of a non-Big 6 auditor. In this case we would anticipate a greater market reaction when the resigning auditor is one of the Big 6.[20] In our model we set the auditor size dummy equal to 1 if

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the Johnson and Lys (1990) sample contained only voluntary auditor changes while we consider only auditor resignations.

[18] The post-announcement cumulative abnormal returns reported in table 3 have been re-calibrated to zero at the end of day −1. Full period (t = −20 to t = +20) buy and hold abnormal returns are not reported. All 88 companies were included in this period.

[19] The abnormal performance of smaller companies cannot be attributed to measurement factors such as missing prices since Datastream calculates return indices for UK firms from the mid-quotes of dealers. This results in a price (and hence a return) for each period.

[20] This may, however, be compensated for by the fact that smaller audit firms will be less inclined to lose a quoted client. Thus, resignation by a non-Big 6 auditor might be interpreted by the market as a rather more costly signal.

Table 3
Cumulative abnormal returns on firms around auditor resignations

	Full Sample				*Large*				*Small*				
Day	AAR	t-stat	BHAR	t-stat	AAR	t-stat	BHAR	t-stat	AAR	t-stat	BHAR	t-stat	WMW test
−20	0.0259	0.17	0.0259	0.17	−0.0454	−0.43	−0.0454	−0.43	0.1041	0.34	0.1041	0.34	1.10
−19	−0.2023	−1.05	−0.1779	−0.72	−0.3447	−1.05	−0.3940	−1.14	−0.0462	−0.25	0.0592	0.16	0.21
−18	−0.1751	−0.36	−0.3561	−0.65	−0.0285	−0.08	−0.4266	−0.83	−0.3358	−0.36	−0.2788	−0.28	0.96
−17	**0.7767**	**1.73***	0.4455	0.63	0.4408	1.61	0.0179	0.03	1.1451	1.28	0.9145	0.68	0.43
−16	0.1010	0.46	0.5690	0.77	−0.1475	−0.40	−0.0941	−0.14	**0.3735**	**1.71***	1.2962	0.95	**−1.75***
−15	0.1984	0.32	0.7367	0.76	−0.1253	−0.76	−0.2227	−0.32	0.5533	0.42	1.7890	0.95	0.56
−14	**−0.5539**	**−2.23****	0.2336	0.23	**−0.8816**	**−2.20****	−1.0514	−1.30	−0.1945	−0.71	1.6429	0.86	−1.18
−13	**−0.3077**	**−1.73***	−0.0728	−0.07	−0.1380	−0.63	−1.1534	−1.37	**−0.4938**	**−1.74***	1.1125	0.58	0.04
−12	0.0910	0.25	0.0192	0.02	0.0003	0.00	−1.1453	−1.32	0.1904	0.26	1.2964	0.63	−0.03
−11	**−0.6368**	**−1.93***	−0.5620	−0.50	−0.2569	−0.61	−1.2941	−1.34	**−1.0534**	**−2.06****	0.2379	0.11	**1.79***
−10	−0.2639	−1.14	−0.7698	−0.67	0.0078	0.03	−1.2227	−1.23	−0.5620	−1.40	−0.2730	−0.13	0.47
−9	**−0.4647**	**−2.46****	−1.2103	−1.04	−0.4128	−1.62	−1.5958	−1.55	**−0.5215**	**−1.84***	−0.7874	−0.36	0.91
−8	**−1.3921**	**−1.83***	**−2.5379**	**−1.82***	**−0.4821**	**−2.01****	**−2.0199**	**−1.91***	−2.3903	−1.52	−3.1061	−1.15	0.13
−7	−0.5473	−1.44	**−3.0004**	**−2.07****	−0.3240	−1.14	**−2.3206**	**−2.12****	−0.7923	−1.07	−3.7461	−1.34	−0.28
−6	1.4674	1.14	−2.2788	−1.18	0.3468	0.61	−2.0889	−1.70	2.6963	1.02	−2.4871	−0.65	−0.07
−5	−0.2599	−0.30	−2.5229	−1.19	0.6518	0.98	−1.7043	−1.22	−1.2597	−0.77	−3.4208	−0.82	−0.30
−4	0.9133	1.59	−1.9206	−0.87	1.1006	1.22	−0.8499	−0.51	0.7079	1.00	−3.0949	−0.73	−0.53
−3	0.1967	0.70	−1.7349	−0.78	0.4606	0.89	−0.3720	−0.21	−0.0926	−0.63	−3.2298	−0.76	0.50
−2	−0.3164	−1.36	−2.0216	−0.91	0.2183	0.76	−0.1230	−0.07	**−0.9029**	**−2.61****	−4.1039	−0.96	**1.93***
−1	−0.1355	−0.43	−2.2181	−0.99	−0.0713	−0.12	−0.3081	−0.17	−0.2059	−1.16	−4.3130	−1.01	0.87

Table 3 (cont.)

	Full Sample				*Large*				*Small*				
Day	AAR	t-stat	BHAR	t-stat	AAR	t-stat	BHAR	t-stat	AAR	t-stat	BHAR	t-stat	WMW test
0	**−0.3694**	**−2.32****	**−0.3694**	**−2.32****	**−0.4355**	**−1.97***	**−0.4355**	**−1.97***	−0.2969	−1.28	−0.2969	−1.28	−0.26
1	0.0541	0.22	−0.3119	−1.06	0.2199	0.57	−0.2148	−0.48	−0.1278	−0.42	−0.4183	−1.09	0.24
2	−0.6218	−1.47	**−0.9653**	**−1.88***	−0.8439	−1.15	−1.1181	−1.30	−0.3783	−1.02	−0.7978	−1.50	0.04
3	0.1090	0.34	−0.8995	−1.48	0.4919	1.03	−0.7087	−0.72	−0.3110	−0.74	−1.1089	−1.63	0.55
4	0.0365	0.13	−0.8472	−1.27	0.0268	0.10	−0.6726	−0.66	0.0471	0.09	−1.0387	−1.22	−0.33
5	0.0663	0.28	−0.7817	−1.11	0.3671	1.15	−0.3366	−0.32	−0.2635	−0.76	−1.2700	−1.39	0.81
6	−0.2538	−0.95	−1.0291	−1.36	−0.2623	−0.54	−0.5962	−0.51	−0.2445	−1.33	−1.5039	−1.61	1.26
7	0.0512	0.15	−0.9392	−1.14	0.3962	1.05	−0.2119	−0.17	−0.3272	−0.59	−1.7369	−1.59	0.58
8	−0.1125	−0.41	−1.0386	−1.19	0.2513	0.71	0.0727	0.06	−0.5116	−1.24	**−2.2573**	**−1.94***	0.16
9	0.0232	0.08	−0.9571	−1.05	0.4666	1.16	0.6066	0.45	−0.4631	−1.24	**−2.6720**	**−2.18****	0.93
10	−0.0614	−0.22	−0.9304	−0.97	0.1298	0.35	0.8200	0.59	−0.2711	−0.63	**−2.8502**	**−2.20****	0.11
11	−0.1590	−0.51	−1.004	−1.00	−0,1010	−0.38	0.8143	0.57	−0.2226	−0.38	**−2.9907**	**−2.10****	−0.26
12	0.0835	0.48	−0.9155	−0.90	−0.0295	−0.16	0.8081	0.57	0.2074	0.68	**−2.8060**	**−1.93**	−0.72
13	**−0.5475**	**−1.72***	−1.4821	−1.39	−0.2066	−0.79	0.4925	0.34	−0.9213	−1.53	**−3.6478**	**−2.32****	0.24
14	−0.0185	−0.11	−1.4625	−1.35	−0.1135	−0.51	0.4239	0.29	0.0858	0.32	**−3.5315**	**−2.21****	0.24
15	−0.4331	−1.60	**−1.8583**	**−1.67***	0.1016	0.45	0.4616	0.31	**−1.0195**	**−2.07****	**−4.4028**	**−2.64****	1.63
16	0.1742	0.63	−1.7892	−1.56	−0.1460	−0.74	0.2697	0.18	0.5254	0.98	**4.0473**	**−2.31****	−0.35
17	−0.4630	−1.08	**−2.1518**	**−1.75***	0.1101	0.74	0.3412	0.23	−1.0916	−1.24	**−4.8860**	**−2.49****	**2.46****
18	−0.0887	−0.50	**−2.1909**	**−1.77***	**0.2871**	**1.71***	0.6492	0.43	−0.5008	−1.63	**−5.3059**	**−2.67****	**2.15****
19	0.4137	1.44	−1.8495	−1.45	0.0490	0.14	0.6519	0.42	**0.8138**	**1.75***	**−4.5931**	**−2.25****	−1.12
20	0.2171	0.43	−1.8469	−1.35	−0.0486	−0.24	0.6007	0.38	0.5086	0.49	**−4.5314**	**−1.98***	1.12

Daily abnormal returns are derived from the market-adjusted model, $AR_{it} = R_{it} - R_{mt}$. Test statistics are constructed using standardised abnormal returns whereas reported abnormal returns are unadjusted. As a result, the signs of some abnormal return observations and their test statistics may differ. BHAR is the cumulative buy and hold abnormal return, which is measured as

$$BHAR = \left[\prod_{t=1}^{n} (1 + AAR_t) \right] - 1.$$

Cumulative Buy and Hold abnormal returns are re-calibrated to zero at the start of the event date (day 0). Wilcoxon-Mann-Whitney (WMW) test statistics are for the difference between the daily abnormal returns for large and small samples. * denotes significance at the 10% level; ** denotes significance at the 5% level for a two-tailed test. Bold denotes statistical significance.

the resigning auditor was one of the Big 6 auditors and 0 otherwise.

7.2. Conflicts between auditors and the company

The market reaction to the resignation could be influenced by any known conflict between the auditors and company directors. At the very least, such conflict might signal an increased possibility of resignation, thereby reducing the impact of the resignation itself. Conflict was proxied by the nature of the auditor's last audit report prior to resignation. This has been examined by US regulators and academics, who considered a number of questions such as whether the companies are more likely to change an auditor after a qualification and whether the company is more likely to receive a clean opinion after the auditor change.[21] Prior studies indicate a negative market reaction when the audit report was qualified by an outgoing auditor. For instance, Smith and Nichols (1982) compared the weekly share price performance of clients that changed auditors and disclosed a dispute with their auditors with the share price performance of changes with no reported dispute. Companies who were in dispute with their outgoing auditors experienced a statistically significant average price decline during the announcement week, while those who did not indicate any dispute experienced no significant abnormal return. Similarly, for a sample of auditor changes between 1973 and 1982, Smith (1988) found that the stock market reacted negatively when the auditor change disclosure note was defined as 'bad news', which included auditor disagreements and qualifications.

Recently, weak evidence has been presented by Davidson and Gribbin (1995) that auditor changes subsequent to a 'qualified' or 'subject to' audit opinion are associated with a more negative abnormal return than those with 'clean opinions'. They interpreted this as evidence that managers may switch auditors to improve their own reputation. We found that our resignation sample contained an above average number of audit qualifications compared to our matched sample and the ICAEW survey average. Therefore, we expect a greater market reaction for companies that had qualified audit reports before their outgoing auditors resigned.

In our regressions we classify the nature of the report by setting the dummy equal to 1 if the auditor's report was qualified prior to the resignation and 0 otherwise.

7.3. Audit risk

Auditors evaluate risk while in the process of collecting evidence. Audit risk affects the amount of detailed testing required to support the auditor's opinion (e.g. Auditing Practices Committee, 1995). It has also been suggested that they consider the risks arising from being associated with individual clients. For example, Coopers & Lybrand makes it clear that the firm's reputation is more important than the fee income to be had from the acceptance or continuation of appointment from a disreputable client (Coopers & Lybrand, 1992: 115–131). In extreme cases, an auditor might resign because of an abnormally high level of risk. The market reaction to resignations for companies with high audit risk could be more significant because it may indicate that the company is performing badly or even that it faces bankruptcy.

Audit risk is proxied in this study by the audit fee as a percentage of turnover in the year prior to the resignation. Our descriptive statistics in the comparison between the resignation sample and the matched sample suggest that the resignation sample had a higher audit risk.[22]

7.4. Financial distress

Auditors may resign due to the embarrassment of being associated with a failing company. Also, the costs to the auditor from resigning from a failing company are lower than in a company that is a going concern because the discounted value of the future cash flows from audit fees will be re-

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[21] Williams (1988) suggested that a company may seek a change in auditor to correct a possible poor public perception of the company that may be caused by a qualified audit report or poor company performance. Chow and Rice (1982) found that companies are more likely to switch auditors after receiving a qualified opinion. However, they also found companies that changed after a qualification are not more likely to receive a clean opinion than those who did not change after a qualification. On the other hand, Smith (1986), examining 139 audit changes, found only five cases that he classified as 'auditor opinion shopping', where the company eliminated a qualified audit report by changing auditors. Also, Krishnan and Stephens (1995) compared the audit opinion decisions of predecessor and successor auditors of companies that changed auditors relative to the auditors' treatment of non-changing clients. They found no difference in the treatment of companies who changed auditors in the pre-change and post-change years relative to non-changing companies.

[22] This audit risk proxy has a number of weaknesses in that the fee can be affected by a host of factors other than risk. While there is likely to be an association between the audit risk and audit fee, this could be indistinct for a number of reasons. Individual audit partners will be more or less skilled at negotiating the highest possible fee. The cost of higher risk may be passed on to audit staff by means of unduly tight time budgets. Audit fee data can be unreliable because the audit firm could include fees for audit work in the charge for non-audit work. Despite these caveats, studies of audit fees have found audit fee appears to be most heavily influenced by the size and complexity of the audit and also the risk of material misstatement in the financial statements (e.g. Pong and Whittington, 1994). The use of a matched sample helps to isolate factors which are specific to individual companies, as opposed to industry based effects such as complex business cycles. A study of audit fees of US savings and loan companies during the crisis affecting that industry in the mid-1980s found that audit risk had a significant effect on fees (Hill et al. 1994).

Table 4
Regression results - date of auditor resignation letter

Model	*Intercept*	*Auditor size dummy*	*Nature of report dummy*	*Audit risk*	*Financial risk*	*Growth*
Predicted sign		—	—	—	—	+/−
(1) F=2.78*	0.0012 (0.42)	−0.0065 (−1.66)*				
(2) F=3.93*	−0.0037 (−1.75)*		0.0106 (1.98)**			
(3) F=0.06	−0.0051 (−1.86)*			0.0009 (0.23)		
(4) F=1.59	−0.0039 (−1.86)*				−0.0009 (−1.26)	
(5) F=1.67	−0.0040 (−2.13)**					< −0.0001 (−1.29)
(6) F=1.733	−0.0049 (−2.30)**					

For each model, a regression of the relevant period buy and hold abnormal return on a descriptive variable was carried out. Auditor size dummy = 1 if the resigning auditor was one of the Big 6 auditors, 0 otherwise. Nature of report dummy = 1 if the auditor's report was qualified, 0 otherwise. Audit risk is defined as annual auditor remuneration divided by firm total annual turnover and 'high' is defined to be above the median value in the sample. Financial risk is defined as a firm's debt/equity ratio and 'high' is defined to be above the median value in the sample. Growth is defined in terms of the company's fixed asset figure and deemed to be expanding if the figure increases over the two year period prior to resignation and contracting if it decreases. Test statistics are in parentheses. * 10% significance level, ** 5% significance level, for a one-tailed test.

duced. In this case we would expect a higher market reaction if the resignation companies have a high financial risk. In our regression model, financial risk is defined as a firm's debt/equity ratio in the year prior to the resignation.[23]

7.5. *Company growth*

An influence on the auditor resignations may be whether the company is growing in size or contracting. For a growing company the resignation of an auditor may not be anticipated by the market and we would expect a greater market reaction than a contracting company. However, the resignation in growing companies may simply be due to the fact that the company is now proving too difficult a task to audit for small audit companies and in this case we may not expect a greater market reaction.[24]

The resignation of an auditor may be more expected by the market in a contracting company. Consequently, if the company has a declining asset value prior to the resignation the market may anticipate the resignation and the actual resignation may not provide new information. Nonetheless, there could be cases when a contracting or downsizing company simply does not need the services of a large auditor and the Big 6 auditor may resign to pre-empt removal from office or unhappiness with the possible reduction of audit fees.[25]

7.6. *Results*

Ordinary Least Squares regressions were used to relate the market reaction on the date of the auditor resignation to the six variables investigated.[26]

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[23] This proxy is used by Francis and Wilson (1988).

[24] Although the replacement auditor was never disclosed on the day of the resignation we found that for the 33 companies in our sample which changed from a Non-Big 6 auditor to a Big 6 auditor, 23 had increasing fixed assets and 10 declining fixed assets, which is consistent with the overall sample.

[25] For the 10 companies which changed from a Big 6 to Non-Big 6 auditor post-resignation we found that half had declining asset values pre-resignation. This is a slightly different proportion relative to the overall sample. Eichenseher et al. (1989) use total assets and a growth proxy in their study.

[26] We also considered two other periods; the 120 days before the resignation and the 120 days after the resignation. We do not report these results as there were no significant findings.

(See Table 4.) In these regressions we have attempted to use the descriptive variables to explain the actual market reaction to the resignation. We find that only the auditor size variable is significant in the direction predicted.[27] We suggested that Big 6 firms are often seen to provide more credibility than their smaller competitors. Thus, the loss of a Big 6 auditor might be expected to cause a greater loss of credibility. Against expectations, prices rise when the auditor who resigned had previously qualified their audit report. This could indicate that there was a fundamental accounting difference between the company managers and the auditors. Consequently, the market might view the reason for the resignation as an accounting matter rather than some fundamental problem with the business. On the other hand, the companies whose audit reports were unqualified prior to the resignation may be viewed negatively by the market. It may be concerned that the resignation was motivated by other unidentified factors, which could cast doubt on the future performance of the company.[28] Audit risk, financial risk and growth appear to be unrelated to price movements on the auditor's resignation date.

8. Conclusion

The announcement of an auditor's resignation is associated with a significant negative market reaction on the date of the resignation letter. This supports the regulations governing the publication of this information. Previous studies in this area have yielded contradictory results, but our study is based on data derived from a new database for UK auditor resignations. This avoids some of the problems arising in other studies, which are forced to include both voluntary and involuntary changes. Our regression analysis, based on price changes on the day of the resignation, suggest the loss of a Big 6 auditor is associated with a greater negative reaction. Loss of a Big 6 auditor could indicate to the market that the auditee is suffering a greater loss of credibility.

Companies that experience auditor resignations tend to perform poorly on average after the resignation. While there are statutory regulations that require that certain matters be brought to the attention of shareholders and creditors at the time of resignation, such notifications are quite rare. There may be a need to re-examine the purpose of this legislation, to clarify the nature of the disclosures which the auditors are required to make. It is not clear, for example, whether these disclosures should be restricted to professional matters pertaining to auditor independence or audit quality issues, or whether they should extend to the reporting of any price-sensitive information which led to the auditor's resignation.

Appendix 1

Abnormal return test statistics are taken from Boehmer et al. (1991) and are estimated as follows: the market adjusted abnormal returns are first standardised.

$$SAR_{it} = AR_{it}/\hat{\sigma}_i \sqrt{1 + \frac{1}{T_i} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{E=-600}^{-121} (R_{mE} - \bar{R}_m)^2}} \tag{1}$$

where σ_i is security i's standard deviation of the market adjusted abnormal return during an estimation period of 600 days to 121 days prior to the auditor resignation letter.

T_i is the number of trading days in the estimation period of security i.

$\bar{R}_m$ is the average market return during the estimation period. For our tests we use the return on the Financial Times All Share index.

Under the assumption of cross-sectional independence and normally distributed abnormal returns, each standardised abnormal return has a Student t distribution. By the central limit theorem, the distribution of sample average standardised abnormal returns is normal. The Boehmer et al. test statistic (1991) allows for potential deviations in the theoretical distribution of the abnormal returns and estimates the variance from the cross-section of event date abnormal returns. The procedure is as follows: for each day in the event period, the cross-sectional standard deviation of the standardised abnormal returns is then calculated. This can be written as:

$$\sigma_{SAR_t} = \sqrt{\frac{\sum_{i=1}^{N}\left(SAR_{it}\sum_{i=1}^{N} SAR_{it}\Big/N\right)^2}{N(N-1)}} \tag{2}$$

The standardised cross-sectional test statistic is thus:

$$Z = \frac{\sum_{i=1}^{N} SAR_{it}\Big/N}{\sigma_{SAR_t}} \tag{3}$$

Boehmer et al. (1991) report that the test is correctly specified even when there is a variance increase in the event period. It is likely that such a situation will occur with our sample because of the predominantly small market value stocks in our sample. Smaller companies are usually illiquid and traded infrequently. In informationally intensive periods, trading volume usually increases with a corresponding change in return volatility. This would result in the theoretical variance measure for the standardised abnormal returns becoming mis-specified. Buy and hold abnormal returns are calculated for periods longer than one day. This method is preferred over cumulative abnormal returns because many firms in our sample could suffer from the low share price problem that can be encountered in event studies of this type.

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[27] When all variables are considered together we do not find any significant descriptive variables. We do not report these results.

[28] Some caution must be expressed when interpreting these results due to the small size of the 'qualified' report sub-sample.

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Discretionary write-downs, write-offs, and other restructuring provisions: a signalling approach

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Abstract—This paper introduces a model seeking to explain the discretionary write-downs, write-offs, and other restructuring provisions reported by managers. The model comprises a firm, a manager, and a financial market. The firm is about to be restructured. The manager has some private information about the likelihood of success of his restructuring action. The manager may recognise all or part of the expenditure associated with his future restructuring action by reporting a discretionary restructuring provision. The manager chooses whether or not to report a provision, recognising the impact of the provision on his compensation. The paper shows how, under certain conditions, the manager may credibly communicate his private information to investors through his provision policy. Testable implications are consistent with the empirical evidence reported by Strong and Meyer (1987), Elliott and Shaw (1988), and Zucca and Campbell (1992).

1. Introduction

> *'The impact of write-offs is confounded by the existence of an unusually strong set of beliefs about the nature and effects of announcements of impairments... Write-off announcements often are viewed as a signal that the worst is over to be followed by an upturn in the firm's fortunes'.* White, Sondhi, and Fried, 1994: 460.

The increasing number of asset write-downs, write-offs, and other non-recurring provisions has captured the attention of the financial community. According to Strong and Meyer (1987), American corporations made after-tax write-downs of $10 bn over the five years from 1982 to 1987. These write-downs were furthermore largely discretionary.[1] Although casual empiricism and journalistic reports suggest that discretionary asset write-downs (and write-offs and other non-recurring charges) are good news, the evidence reported by empirical studies is mixed.[2] Strong and Meyer (1987) suggest that discretionary write-downs are 'good news' while Zucca and Campbell (1992) and Elliott and Shaw (1988) respectively suggest that discretionary write-downs are either 'no news' or 'bad news'. This paper presents a model seeking to explain the information content of discretionary asset write-downs, write-offs, and other non-recurring provisions concentrating on restructuring provisions.

This paper identifies managerial compensation plans as the economic incentive for reporting discretionary provisions. The treatment thus presents general similarities with Healy (1985) and Dye (1988). It differs, however, from these papers by showing how discretionary write-downs, write-offs, and other non-recurring provisions may be used by managers to reveal private information

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[1] According to Strong and Meyer (1987:644), 'In theory the notion of permanent asset impairment is supposed to guide auditors in determining when values should be revised downward. However, this concept has been applied principally to discontinued operations rather than reevaluations of assets that remain on the balance sheet. In contrast, many of the recent restructurings involve partial write-downs of assets whose values have declined but remain in productive use. This results in broad discretion for companies in determining when and how much to write down.'

[2] According to Elliott and Shaw (1988:93), 'The financial press frequently treats these write-offs as though they are viewed favourably by the securities market.' According to Zucca and Campbell (1992:31), 'Several articles indicated that the stock market reacts positively to asset write-downs. Unfortunately, none of these articles examines whether they may be a similar number of write-downs which resulted in stock price decreases.'

about future earnings.[3]

This paper considers a firm about to be physically restructured, a manager, and a financial market. The manager has some private information, favourable or less favourable, about the likelihood of success of his restructuring action. The manager may recognise all or any part of the expenditure associated with his future restructuring action by reporting a discretionary restructuring provision. He takes his decision recognising that he is endowed with earnings-based bonus plans and maturing stock options. The earnings-based bonus plans are assumed to be bounded below and strictly increasing in reported earnings, as long as reported earnings exceed a given threshold. The financial market values the firm's equity according to the reporting choice announced by the manager. This paper shows how, under certain conditions, the manager may credibly communicate his private information to investors through his provision policy.

The nature of the equilibria achieved depends on the magnitude of the current operating earnings to be reported by the firm's manager. When current operating earnings exceed the lower bound of the bonus plan, equilibria in which the manager endowed with favourable information reports a discretionary restructuring provision and the manager endowed with less favourable information abstains from reporting any provision may obtain (separating equilibria). Conversely, when current operating earnings do not exceed the lower bound of the bonus plan, only equilibria in which both the manager endowed with favourable information and the manager endowed with less favourable information select the same provision policies and hence do not reveal their firms' types can obtain (pooling equilibria).

The intuition is as follows. Reporting a discretionary restructuring provision consists in bringing forward an expense from the end to the beginning of the period. The higher the probability that the firm's restructuring will be unsuccessful, the lower the probability that the operating earnings generated at the end of the period will exceed the lower bound of the earnings-based bonus plan. Thus, when current operating earnings exceed the lower bound of the bonus plan and the probability that the firm's restructuring will be unsuccessful is high enough, reporting a discretionary restructuring provision adversely affects a manager's expected earnings-based compensation. The higher the probability that the firm's restructuring will be unsuccessful, the more adverse the effect. When managers are endowed with a small number of stock-options, the managers endowed with favourable information can thus report a discretionary restructuring provision which the manager endowed with less favourable information does not find incentive-compatible to report. The manager endowed with less favourable information thus abstains from reporting any discretionary restructuring provision. In contrast, when current operating earnings do not exceed the lower bound of the bonus plan, reporting a discretionary restructuring provision has a positive effect on a manager's expected earnings-based compensation. Hence, no separating equilibrium can obtain.

This paper predicts that, when a separating equilibrium prevails, the firms that do report discretionary provisions are less likely to experience low earnings in the next periods than the firms which do not report any discretionary provisions. It also predicts that the former firms should experience, on average, positive abnormal returns around the announcement dates of the discretionary provisions. Conversely, when a pooling equilibrium obtains, the model does not predict positive abnormal returns around the announcement dates of the discretionary provisions. Write-down firms in Elliott and Shaw (1988) and Zucca and Campbell (1992) tend to be amongst the worst performers in their industries while write-down firms in Strong and Meyer (1987) tend to be average performers. As separating equilibria can only obtain when the current operating earnings exceed the lower bound of a manager's bonus plan, this paper thus explains why write-downs are good news in the latter paper and no news or bad news in the former papers.

The paper then extends the model to allow for the probability of a successful restructuring being distributed over an interval. When current operating earnings exceed the lower bound of the bonus plan, a perfectly revealing equilibrium, in which all but the manager endowed with the least favourable information report discretionary restructuring provisions, can obtain. The higher the probability of experiencing a successful restructuring, the higher the restructuring provision. The paper thus predicts that the abnormal share price reaction to the announcement of a discretionary provision should be increasing in the size of the provision.

The paper is organised as follows. The basic model is described and analysed in Section 2. An extension to deal with a continuum of types of firms can be found in Section 3. A summary is provided in Section 4.

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[3] DeAngelo (1988) and Trueman and Titman (1988) present other explanations for these discretionary provisions. This paper also contains similarities with Frantz (1997). It however differs from the latter paper in both the nature of the signalling mechanism and the nature of the signal. DeAngelo (1988) conjectures that dissidents elected in proxy fights tend to take an immediate earnings bath which they typically blame on the poor decisions of prior management and which enables them to report an earnings turnaround the following year. Trueman and Titman (1988) show how it may be rational for managers to engage in income-smoothing in order to lower the perceived variance of their firms' earnings.

2. The basic model

This section introduces a model focusing on the managerial provision policy in a world of asymmetric information. The model comprises a firm, a manager, and a financial market in a multi-period[4] setting at the end of which the firm is liquidated. The firm is about to be physically restructured. The manager has private information about the likelihood of success of his restructuring action. He may recognise all or part of the future expenditure associated with the restructuring action by reporting a discretionary restructuring provision. The model is simplified in order to concentrate on the informative role of the manager's provision policy. In particular, the manager is assumed to be risk-neutral and the capital of the firm is assumed to consist only of equity.[5] This section provides sufficient conditions for the manager to communicate his private information through his provision policy.

2.1. Description

A firm, that has been trading for one period, is experiencing a change in its environment. In the absence of any restructuring, it will fail and will not be profitable in the next period, at the end of which it will be liquidated. The firm's manager may however take between the current date t_0 and the end-of-period (and liquidation) date t_1 a restructuring action involving expenditure R. There is an asymmetry of information between the manager and the financial market about the likelihood of success of this restructuring action, which is captured by the firm's type. The firm may be 'good' or 'bad', the two types of firms differing only in the density functions of the operating earnings (earnings before the recognition of any expense associated with the restructuring action) generated during the next period in the event restructuring takes place. The density function of the operating earnings generated by the good firm will be denoted by $m_G(A^1)$ while the density function of the operating earnings generated by the bad firm will be denoted by $m_B(A^1)$. The good firm's cumulative distribution function of operating earnings $M_G(A^1)$ is assumed to stochastically dominate in the first-order sense the bad firm's cumulative distribution function of operating earnings $M_B(A^1)$. The manager has perfect knowledge of his firm's type. The financial market's prior belief is that the firm is good with probability p.

The bad firm's operating earnings obtaining at date t_1 are assumed to exceed the expenditure associated with the restructuring action with some strictly positive probability.[6] It can then be shown that, given his compensation, the manager will find it incentive-compatible to take the restructuring action. The remaining part of the paper thus concentrates on the recognition of the expenditure associated with the restructuring action in the firm's accounts.

2.1.1. Managerial discretion in reporting

At the current date t_0, the manager has to report the earnings generated by his firm during the previous period. The manager may recognise at date t_0 all or any part of the expenditure R associated with the restructuring action to be taken in the next period. In other words, he may report at date t_0 a discretionary restructuring provision. The manager's choice is captured by r, with $\{r = W, W \in (0, R]\}$ indicating that the manager reports a discretionary restructuring provision W and $\{r = 0\}$ indicating that the manager abstains from reporting any discretionary restructuring provision.[7,8] Reporting a discretionary restructuring provision W at date t_0 brings forward an expense W from date t_1 to date t. If the operating earnings generated in the previous period are denoted as A^0, reporting a discretionary restructuring provision W thus results in earnings reported at date t_0 $A^0(W)$, with $A^0(W) = A^0 - W$, and earnings reported at date t_1 $A^1(W)$, with $A^1(W) = A^1 - R + W$.

2.1.2. Manager's compensation

The manager is rational and decides whether or not to report a restructuring provision recognising that he is endowed with earnings-based bonus plans and maturing stock-options. These earnings-based bonus plans are assumed to be bounded below and linearly increasing in the firm's reported earnings when the firm is reporting profits.[9] The stock-options are assumed to mature at date t_0.[10] In order to facilitate the exposition, the stock-options' exercise price is furthermore assumed to be nil.[11] More formally, the manager's compensation is given by the following expression:

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[4] In order to simplify the exposition, the model consists of the smallest number of reporting dates allowing for a proper analysis of the manager's reporting choice (two dates). The propositions developed in this paper would, however, still obtain in a setting consisting of more reporting dates.

[5] These assumptions are made for exposition purposes. The propositions developed in this paper would still obtain if these assumptions were violated.

[6] More formally: $M_B(R) < 1$.

[7] To focus on the information content of discretionary restructuring provisions, managerial discretion in reporting is assumed to be limited to both the decision whether or not to report a provision and the magnitude of such a provision. Given the structure of the model, the decision whether or not to report a discretionary restructuring provision is thus the only signal available to the manager.

[8] The propositions derived in this section would still obtain if managerial discretion was limited to recognition as opposed to valuation. Similarly, the propositions derived in this paper would still obtain if there was no upper bound on the size of any allowed restructuring provision.

$$\alpha \max[0, A^0(r)] + \zeta V^M(r) + \delta\beta \max[0, A^1(r)] \quad (1)$$

where α, with $0<\alpha<1$, represents the proportion of the firm's profits allocated to the manager's bonus plans at date t_0; β, with $0<\beta<1$, represents the proportion of the firm's profits allocated to the manager's bonus plans at date t_1; ζ, with $0<\zeta<1$, represents the proportion of the firm equity allocated to the manager as stock-options; $V^M(r)$ represents the market value of the firm as inferred by the financial market at date t_0; and δ, with $0<\delta<1$, represents the manager's rate of time preference.

The manager's objective function is determined exogenously in this model. It would however appear to be compatible with the compensation schedules observed empirically [Healy (1985)]. It might also be justified on more theoretical grounds. The game analysed in this paper may be considered as a subgame of a larger game involving a moral hazard problem between the firm's manager and shareholders. In an environment characterised by a separation between ownership and management, the manager's optimal compensation schedule may depend on both stock prices and reported earnings, despite the fact that stock prices impound all available information including earnings (Bushman and Indejikian, 1993; Kim and Suh, 1993). In such an environment, it may furthermore be optimal to leave the manager some discretion in reporting as the accounting choice may reveal some information about the manager's actions or effort, and thus alleviate the underlying moral hazard problem (Demski, Patell and Wolfson, 1984; Dye and Verrechia, 1995; Verrechia, 1986).

2.1.3. *Manager's maximisation programme*

The manager of a firm of type q, where $\{q=G\}$ denotes the good firm and $\{q=B\}$ denotes the bad firm, thus decides whether or not to report a restructuring provision with the following objective:

$$\max_r \; C_q(r) + \zeta V^M(r) \qquad \text{s.t.} \quad r \in [0, R] \quad (2)$$

where $C_q(r) = \alpha \max[0, A^0(r)] + \delta\beta E[\max[0, A^1(r)]|q]$ is the earnings-based compensation expected by the manager of a firm of type q selecting r. Given rational expectations by investors, $V^M(r) \equiv E[V_q(r)|r]$, where $V_q(r)$ represents the intrinsic value of a firm of type q when the manager selects r.

The magnitude of the restructuring provision reported affects a manager's earnings-based compensation and hence a firm's cash-flows. The intrinsic value of a firm of any type thus depends on the magnitude of the restructuring provision reported by the firm's manager. The intrinsic value of the good firm is therefore assumed to exceed the intrinsic value of the bad firm, regardless of the restructuring provisions selected. The number of maturing stock-options is also assumed to be small enough, so that the 'first-order' effect of a restructuring provision on the manager's earnings-based compensation is not cancelled out by the 'second-order' effect of the change in the manager's earnings-based compensation on the perceived market value of the manager's stock-options on and off the equilibrium path.

2.2. *Strategic analysis*

This section provides conditions under which various types of equilibria may obtain. The equilibrium concept used in this paper is a perfect Bayesian equilibrium (PBE). In the context of this paper, a perfect Bayesian equilibrium is a set of strategies and beliefs—made up by the good firm's choice of restructuring provision, the bad firm's choice of restructuring provision, the financial market's conditional valuation of the firm, and the belief about the firm's type held by the financial market when faced with out-of-equilibrium selections of restructuring provisions—satisfying the following properties: the choices of restructuring provisions are optimal given the financial market's conditional valuation and the financial market's belief about the firm's type is derived from the application of Bayes' rule whenever possible.[12]

The nature of the equilibria obtaining in this paper depends on the magnitude of the current operating earnings generated by the firm:

Lemma 1. When the earnings reported at the current date exceed the lower bound of the manager's bonus plan whatever the reporting choice made, that is, $A^0 - R \geq 0$, and the probability that the firm's restructuring will be unsuccessful is high enough, reporting a discretionary restructuring provision adversely affects a manager's expected earnings-based compensation, whatever the type of his firm. This cost is higher to the manager of the bad firm than it is to the manager of the good firm. The difference between the cost to the manager of the bad firm and the cost to the manager of the good firm is furthermore strictly increasing in the size of the provision reported. In contrast, when current operating earnings do not exceed the lower bound of the bonus plan, that is, $A^0 \leq 0$, reporting a discretionary restructuring provision has a positive effect on a manager's expected earnings-based compensation, whatever the type of his firm.[13]

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[9] The functional form taken by the manager's earnings-based compensation is similar to the one introduced by Healy (1985). The propositions developed in this paper would still obtain if either the compensation function was not linear in reporting earnings or the lower bound was different from zero.

[10] The propositions derived in this paper would still obtain if, in addition to stock-options maturing prior to the end of the period, there were also stock-options maturing at the end of the period.

[11] The propositions derived in this paper would still obtain as long as the stock-options' exercise price was lower than the intrinsic share price of the bad firm regardless of the restructuring provision reported.

[12] Fudenberg and Tirole (1991) define a perfect Bayesian equilibrium as 'a set of strategies and beliefs such that, at any stage of the game, strategies are optimal given beliefs, and beliefs are obtained from equilibrium strategies and observed actions using Bayes' rule'.

Proof. If the earnings reported at the current date exceed the lower bound of the bonus plan whatever the reporting choice made, that is, $A^0 - R \geq 0$, the earnings-based compensation expected by the manager of a firm of type q reporting a discretionary restructuring provision W, $C_q(W)$, is given by the following equality:

$$C_q(W) = \alpha(A^0 - W) + \delta\beta \int_{R-W}^{+\infty} (A^1 - R + W) m_q(A^1) dA^1 \quad (3)$$

If the probability that the good firm's restructuring will be unsuccessful is high enough[14], that is, $1 - M_G(0) < \frac{\alpha}{\delta\beta}$, reporting a discretionary restructuring provision W thus adversely affects a manager's expected earnings-based compensation, whatever the type of his firm. In contrast, when the current operating earnings do not exceed the lower bound of the manager's bonus plan, that is, $A^0 \leq 0$, the earnings-based compensation expected by the manager of a firm of type q reporting a discretionary restructuring provision W, $C_q(W)$, is given by the following equality:

$$C_q(W) = \delta\beta \int_{R-W}^{+\infty} (A^1 - R + W) m_q(A^1) dA^1 \quad (4)$$

Reporting a discretionary restructuring provision W thus has a positive effect on a manager's expected earnings-based compensation, whatever the type of his firm. The benefit of reporting a discretionary restructuring provision is furthermore higher to the manager of the good firm than it is to the manager of the bad firm.

2.2.1. Equilibrium reporting decisions when current operating earnings exceed the lower bound of the manager's bonus plan and the probability that the firm's restructuring will be unsuccessful is high enough.

When the earnings reported at the current date exceed the lower bound of the manager's bonus plan whatever the reporting choice made, that is, $A^0 - R \geq 0$, and the probability that the firm's restructuring will be unsuccessful is high enough, the following propositions obtain:

> **Proposition 1.** No separating equilibrium, in which the manager of the bad firm chooses to report a discretionary restructuring provision and the manager of the good firm chooses not to report any discretionary provision, can possibly obtain.

Proof. No separating equilibrium, in which the manager of the bad firm reports a discretionary provision W while the manager of the good firm abstains from reporting any discretionary provision, can obtain because the manager of the bad firm finds it incentive-compatible to defect from his equilibrium strategy. By deviating from his equilibrium strategy and pooling with the manager of the good firm, the manager of the bad firm derives the following incremental utility, $C_B(0) - C_B(W) + \zeta[V_G(0) - V_B(W)]$, which is strictly positive. By defecting from his separating equilibrium strategy and pooling with the manager of the good firm, the manager of the bad firm enjoys an increase in both his earnings-based compensation and the proceeds resulting from the exercise of his maturing stock-options.

> **Proposition 2.** A separating equilibrium, in which the manager of the good firm reports a discretionary restructuring provision W, the manager of the bad firm abstains from reporting any discretionary provision, and investors believe that any deviating firm is a bad firm, obtains if the discretionary restructuring provision satisfies the following inequalities:
>
> $$C_G(0) - C_G(W) \leq \zeta\,[V_G(W) - V_B(0)] \leq C_B(0) - C_B(W) \quad (5)$$
>
> The set of discretionary restructuring provisions satisfying these conditions is not empty if the number of maturing stock-options is small enough, that is, if:

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[13] Interim cases, in which $0 < A^0 < R$, are ignored as they do not provide any additional insights.

[14] The propositions developed in this paper obtain as long as the probability that the bad firm's restructuring will be unsucunsuccessful is high enough, that is, $1 - M_B(0) < \frac{\alpha}{\delta\beta}$, in which the reporting of a discretionary restructuring provision W may or may not have an adverse effect on the earnings-based compensation expected by the manager of the good firm.

$$\zeta \leq \frac{C_B(0) - C_B(R)}{V_G(R) - V_B(0)} \tag{6}$$

A continuum of separating equilibria may thus obtain. In each of these equilibria, the equilibrium restructuring provision W belongs to the interval $[W^*, R]$, where W^* is the provision reported by the manager of the good firm in the efficient separating equilibrium.[15]

Proof. A proof of Proposition 2 can be found in the Appendix. The intuition is as follows. Reporting a discretionary restructuring provision consists in bringing forward an expense from the end to the beginning of the period. The higher the probability that the firm's restructuring will be unsuccessful, the lower the probability that the operating earnings generated at the end of the period will exceed the lower bound of the earnings-based bonus plan. Thus, when current operating earnings exceed the lower bound of the bonus plan and the probability that the firm's restructuring will be unsuccessful is high enough, reporting a discretionary restructuring provision adversely affects a manager's expected earnings-based compensation. The higher the probability that the firm's restructuring will be unsuccessful, the more adverse the effect.For the manager of the good firm not to deviate from his equilibrium policy, the marginal gain from deviating, that is, the increase in his earnings-based compensation resulting from abstaining from reporting a discretionary provision, should be smaller than the marginal cost from deviating; that is, the decrease in his compensation resulting from his firm being identified as a bad firm. Similarly, for the manager of the bad firm not to deviate from his equilibrium policy, the marginal gain from deviating, that is, the increase in his compensation resulting from his firm being identified as a good firm, should be smaller than the marginal cost from deviating—that is, the decrease in his earnings-based compensation resulting from the impact of the discretionary provision on his firm's reported earnings. When the number of stock options is small enough, there exists 'feasible' restructuring provisions, that is, restructuring provisions which do not exceed the restructuring expenditure, which the manager of the good firm finds incentive-compatible to report and the manager of the bad firm finds incentive-compatible not to report.

Corollary 1. *Controlling for surprises in current operating earnings, the market reaction to the announcement of a discretionary provision in a separating equilibrium is positive.*

Proof. A formal proof can be found in the Appendix. Intuitively, the market reaction to the announcement of a discretionary provision in a separating equilibrium is positive because the discretionary restructuring provision signals that the firm is good.

Proposition 3. A pooling equilibrium, in which the managers of both types of firms choose to report a discretionary restructuring provision W and investors believe that a firm deviating from this provision policy is a bad firm, obtains if the prior probability that the firm is good is high enough. A continuum of pooling equilibria may thus obtain.

Proof. A proof of Proposition 3 can be found in the Appendix. The intuition is as follows. A pooling equilibrium, in which firms of both types do report a discretionary restructuring provision W and investors believe that a firm deviating from this provision policy is a bad firm, can only obtain if investors' prior beliefs are that the firm is a good firm with a high enough probability, since otherwise, the marginal benefit accruing to the manager of a bad firm deviating from his equilibrium strategy and abstaining from reporting any discretionary provision, that is, the increase in the manager's earnings-based compensation resulting from abstaining from reporting any discretionary provision, would exceed the marginal cost resulting from his firm being identified as a bad firm.

Proposition 4. A pooling equilibrium, in which the managers of both types of firms do abstain from reporting any discretionary restructuring provisions, and investors believe that a firm deviating from its equilibrium strategy is a bad firm, always obtains.

Proof. The proof of Proposition 4 is similar to that of Proposition 3 and is therefore omitted. The intuition is as follows. The manager of any firm, who deviates from his equilibrium strategy by reporting a discretionary provision, suffers from a decrease in both his earnings-based compensation and the proceeds resulting from the exercise of his maturing stock-options. No manager will thus ever want to deviate from his equilibrium strategy.

A large number of equilibria can thus obtain. This is due to the equilibrium concept used in the paper which does not restrict beliefs off the equilibrium path. Some of the equilibria derived in this section may however be sustained by outrageous beliefs. Strategic refinements which attempt to put 'sensible' restrictions on beliefs off the equilibrium path are thus considered:

Proposition 5. Both pooling and separating PBEs are sequential.[16] But only the pooling equilibrium, in which both firms report the largest allowed discretionary restructuring provision R, and the efficient separating equilibrium do survive the D1 criterion introduced by Cho and Kreps (1987). These equilibria are also the only ones to satisfy Banks and Sobel's (1987) Ultimate Divinity and Kohlberg and Mertens' (1986) Never Weak Best Response (NWBR) strategic refinements.

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[15] In the efficient separating equilibrium, the manager of the good firm reports the discretionary restructuring provision W^* which leaves the manager of the bad firm indifferent between complying with and defecting from his equilibrium choice.

[16] A set of strategies and beliefs is said to form a sequential

Proof. The proof of Proposition 5 can be found in the Appendix. The intuition is as follows. The separating equilibria are sustained by the out-of-equilibrium belief that any deviating firm is a bad firm. This belief may however not be 'sensible'. Let us, for instance, consider a non-efficient separating equilibrium and an out-of-equilibrium restructuring provision which is smaller than the equilibrium one but larger than the efficient one. As the cost of reporting a restructuring provision is higher to the manager of the bad firm than it is to the manager of the good firm and furthermore increases in the size of the provision, the commonly used strategic refinements considered in this paper impose the following out-of-equilibrium belief: any firm reporting this out-of-equilibrium provision is a good firm. But this belief induces the manager of the good firm to defect from his equilibrium strategy. No non-efficient separating equilibrium can therefore survive the commonly used strategic refinements considered in this paper. It can furthermore be shown that both the equilibria surviving the strategic refinements considered in Proposition 5 cannot coexist for a given set of parameters. When the number of stock-options the manager is endowed with is small enough, the efficient separating equilibrium is thus the only equilibrium obtaining in the game.

2.2.2. Equilibrium reporting decisions when current operating earnings do not exceed the lower bound of the manager's bonus plan.

When the current operating earnings do not exceed the lower bound of the manager's bonus plan, that is, $A^0 \leq 0$, the following propositions obtain:

Proposition 6. A continuum of pooling equilibria, in which the managers of both types of firms either elect to report a discretionary restructuring provision W or abstain from reporting any provision and investors believe that a firm deviating from the equilibrium provision policy is a bad firm, obtain if the prior probability that the firm is good is high enough. No other equilibrium can possibly obtain.

Proposition 7. All pooling equilibria are sequential. But only the pooling equilibrium, in which the managers of both types of firms choose to report the largest allowed discretionary restructuring provision R, survives strategic refinements such as Cho and Kreps (1987) D1 criterion, Banks and Sobel's (1987) Ultimate Divinity, or Kohlberg and Mertens' (1986) Never Weak Best Response (NWBR) strategic refinements.[17]

Corollary 2. *Controlling for surprises in current operating earnings, there is no abnormal share price reaction to the announcement of a discretionary restructuring provision.*

Proof. A proof of the non-existence of separating equilibria can be found in the Appendix. The proof of Proposition 7 is similar to that of Proposition 5 and is therefore omitted. The intuition is as follows. Reporting a discretionary restructuring provision consists in bringing forward an expense from the end to the beginning of the period. When current operating earnings do not exceed the lower bound of the bonus plan, reporting a discretionary restructuring provision has a positive effect on a manager's expected earnings-based compensation, whatever the type of his firm. Hence, no separating equilibrium, in which the manager of the good firm reports a discretionary provision and the manager of the bad firm abstains from reporting any discretionary restructuring provision, can possibly obtain.[18] Furthermore, as the benefit of reporting a discretionary restructuring provision is higher to the manager of the good firm than it is to the manager of the bad firm, no separating equilibrium, in which the manager of the bad firm reports a discretionary provision and the manager of the good firm abstains from reporting any discretionary restructuring provision, can possibly obtain. The pooling equilibria, in which the managers of both types of firms either elect to report a discretionary restructuring provision or abstain from reporting any restructuring provision, are sustained by the out-of-equilibrium belief that any deviating firm is a bad firm. This belief may, however, not be 'sensible'. Consider any pooling equilibrium in which the managers of both types of firms elect to report a discretionary restructuring provision which is strictly smaller than the largest allowed one. As the benefit of reporting a discre-

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equilibrium if it is both sequentially rational and consistent. A set is consistent if it is the limit of some sequence of mixed strategies and beliefs, where the beliefs are derived from the application of Bayes' rule.

[17] An introduction to these strategic refinements can be found in Fudenberg and Tirole (1991).

[18] By deviating from his equilibrium strategy and pooling with the manager of the good firm, the manager of the bad firm enjoys an increase in both his earnings-based compensation and the proceeds resulting from the exercise of his maturing stock-options.

tionary restructuring provision is higher to the manager of the good firm than it is to the manager of the bad firm—and furthermore increases in the size of the provision—the commonly used strategic refinements considered in this paper impose the following out-of-equilibrium belief: any firm reporting the largest allowed discretionary restructuring provision is a good firm. But this belief induces the managers of both types of firms to defect from their equilibrium strategies. By deviating from their equilibrium strategies, they enjoy increases in both their earnings-based compensation and the proceeds resulting from the exercise of their maturing stock-options. No pooling equilibria, in which the managers of both types of firms elect to report a discretionary restructuring provision which is strictly smaller than the largest allowed one, can therefore obtain. Only the pooling equilibrium, in which the managers of both types of firms choose to report the largest allowed discretionary restructuring provision, thus survives the commonly used strategic refinements considered in this paper.

3. Extension to a continuum of types of firms

The basic model introduced in the previous section considered a firm experiencing a change in its environment and about to be restructured. The firm could be of two types: good or bad. The model is now extended to deal with a continuum of types of firms, the type of the firm q capturing the likelihood of success of the restructuring action (and hence the cumulative distribution of the operating earnings generated at the end of the period). The probability q is distributed on the interval $[q_{\min}, q_{\max}]$, with $0 < q_{\min} < q_{\max} < 1$, according to a strictly increasing distribution function. For any $\underline{q}$ and $\overline{q}$, with $\underline{q} < \overline{q}$, the cumulative distribution of the operating earnings generated at the end of the period by a firm of type $\overline{q}$ stochastically dominates in the first-order sense the cumulative distribution of the operating earnings generated at the end of the period by a firm of type $\underline{q}$. Gross of the manager's compensation, the intrinsic value of a firm of type q is furthermore assumed to be increasing in q. The manager has perfect knowledge of his firm's type. The financial market only knows the distribution of q.

As in the previous section, the manager has to report the earnings generated by his firm during the previous period. He may recognise all or some part of the future expenditure R associated with his restructuring action. Attention is restricted to the case in which the earnings reported at the current date exceed the lower bound of the bonus plan whatever the reporting choice made, that is, $A^0 - R \geq 0$. Attention is also restricted to the case in which the probability that the restructuring of the firm of quality $q_{\max}$ will be unsuccessful is high enough,

that is, $1 - Mq_{\max}(0) < \frac{\alpha}{\delta\beta}$. The manager's choice is captured by r, with $\{r = W,\ W \in (0, R]\}$ indicating that the manager reports a discretionary restructuring provision W and $\{r = 0\}$ indicating that the manager abstains from reporting any discretionary restructuring provision. He takes his decision, recognising that he is endowed with the bonus plans and maturing stock options described in the previous section. The financial market perceives the firm's type q to be a function of the size of the provision. This function will be referred to as $q(r)$.[19] The manager of a firm of type q thus selects r with the following objective:

$$\max_r \; C_q(r) + \zeta V^M(r) \qquad s.t. \quad r \in [0, R] \tag{7}$$

Maximising this objective function for any given market valuation schedule $q(r)$ determines an optimal provision r^*, which depends on the quality of the firm q. We are however not interested in any arbitrary market valuation schedule $q(r)$. Rather, we shall restrict our attention to market valuation schedules which have an equilibrium property. A market valuation schedule $q(r)$ is said to be an equilibrium valuation schedule if the quality of the firm q is correctly identified by the market for all values of q.[20] More formally: $q[r^*(q)] = q$. The extended model introduced in this section enables us to derive the following proposition:

Proposition 8. There exists a unique efficient equilibrium valuation schedule $q(r)$. In this equilibrium, the manager of the firm of the worst quality abstains from reporting any discretionary restructuring provision and the managers of all other types of firm do report a discretionary restructuring provision. The larger the provision, the higher the likelihood of success of the restructuring action. It is furthermore implementable, that is, the equilibrium discretionary restructuring provision reported by the manager of the firm of the best quality does not exceed the restructuring expenditure R to be incurred in the future, as long as managers are endowed with a small number of stock-options.

Corollary 3. Controlling for surprises in current earnings, the abnormal share price reaction to the announcement of a discretion-

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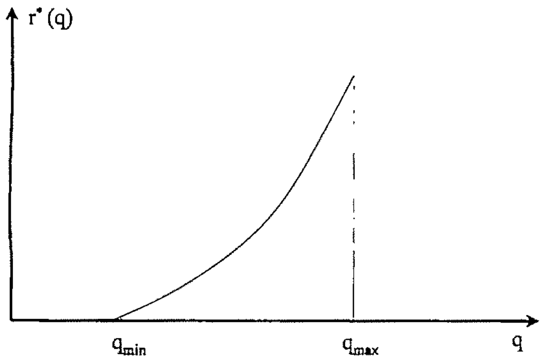
[19] This function is assumed to be infinitely differentiable in all variables. The proposition derived in this section would still obtain if it was differentiable almost anywhere.

[20] This definition of an equilibrium valuation schedule is similar to the one provided by Leland and Pyle (1977).

Figure 1
Equilibrium restructuring provision schedule



This graph shows how the equilibrium restructuring provision r* reported by the manager is increasing in the quality q of his firm.

ary restructuring provision is a strictly increasing function of the size of the provision reported.

Proof. A formal proof of Proposition 8 and its corollary can be found in the Appendix. The equilibrium restructuring provision schedule is illustrated in Figure 1.

The intuition is as follows. The cost of reporting a discretionary restructuring provision is decreasing in the probability of success of the restructuring action. In any separating equilibrium, the valuation schedule $q(r)$ is thus increasing in r. When the number of stock-options is small enough, the equilibrium discretionary restructuring provision reported by the manager of the firm of the best quality furthermore does not exceed the restructuring expenditure R to be incurred in the future. As the type of any firm is revealed in any separating equilibrium, the manager of the firm of the worst quality abstains from reporting any discretionary restructuring provision.

4. Summary

This paper introduces a model seeking to explain the discretionary write-downs, write-offs, and other provisions reported by managers. It considers a firm about to be restructured, a manager, and a financial market. The manager is endowed with some private information, favourable or less favourable, about the likelihood of success of his restructuring action, which is captured by the firm's type. He chooses whether or not to report a discretionary restructuring provision recognising that he is endowed with earnings-based bonus plans and maturing stock-options, the earnings-based bonus plan being capped below and strictly increasing in reported earnings when reported earnings exceed some threshold. The financial market values the firm's equity according to the reporting choice made by the manager. The paper provides sufficient conditions for separating and pooling rational expectations equilibria to obtain.

The nature of the equilibria obtaining depends on the magnitude of the current earnings to be reported by the firm's manager. When the current earnings exceed the lower bound of the bonus plan, separating equilibria, in which the manager endowed with favourable information reports a discretionary restructuring provision while the manager endowed with less favourable information abstains from reporting any provision, can obtain. When the number of stock-options the manager is endowed with is small enough, the efficient separating equilibrium is furthermore the only equilibrium to pass commonly used strategic refinements. Conversely, when the current earnings to be reported by the firm's manager do not exceed the lower bound of the manager's bonus plan, no separating equilibria can obtain. The equilibrium in which both the manager endowed with favourable information and the manager endowed with less favourable information choose to report the largest allowed discretionary restructuring provision is furthermore the only equilibrium to pass commonly used strategic refinements.

In this paper, the manager endowed with favourable information signals the quality of his firm, and thus the likelihood of his firm seeing a successful restructuring, by reporting a discretionary restructuring provision covering part of the future expenditure associated with the firm's restructuring. If the firm's restructuring involves any write-downs or write-offs of assets, the manager endowed with favourable information can also signal the quality of his firm by reporting a discretionary write-down or write-off. This is so because reporting a discretionary write-down or write-off also brings forward an expense which otherwise would have been recognised at a later date.

This paper predicts that, when a separating equilibrium prevails, the firms which do report discretionary write-downs, write-offs, and other restructuring provisions are less likely to experience low earnings in the next periods than the firms which do not report any. The paper also predicts that the former firms should experience, on average, positive abnormal returns around the announcement dates of the discretionary provisions. Conversely, when a pooling equilibrium obtains, the paper predicts no positive abnormal returns. This paper thus explains why write-downs are good news in Strong and Meyer (1987) and no news or bad news in Elliott and Shaw (1988) and Zucca and Campbell (1992).

A. Appendix

A.1. Proof of Proposition 2

In a separating equilibrium, the manager of the bad firm reveals his type and chooses therefore not to report any discretionary provision. If he chose to report a provision, he would strictly gain by abstaining from reporting a provision because reporting a provision decreases his earnings-based compensation. Conversely, the manager of the good firm chooses to report a discretionary provision W. If he chose not to report a provision, the equilibrium would be a pooling rather than a separating one. Let us therefore consider the following set of strategies and beliefs. The manager of the bad firm chooses to abstain from reporting any discretionary provision, the manager of the good firm chooses to report a discretionary provision W, and investors believe that any out-of-equilibrium provision $\hat{W}$ is reported by the manager of the bad firm. By deviating from his separating strategy and pooling with the manager of the bad firm, the manager of the good firm derives the following incremental utility: $C_G(0) - C_G(w) - \zeta[V_B(0) - \mathrm{V}_{\mathrm{G}}(W)]$. Similarly, by deviating from his separating strategy and pooling with the manager of the good firm, the manager of the bad firm derives the following incremental utility: $\mathrm{C}_{\mathrm{B}}(W) - \mathrm{C}_{\mathrm{B}}(0) + \zeta[\mathrm{V}_{\mathrm{G}}(W) - \mathrm{V}_{\mathrm{B}}(0)]$. Neither the manager of the good firm nor the manager of the bad firm thus have any incentive to deviate if and only if the following set of inequalities is satisfied:

$$C_G(0) - C_G(W) \leq \zeta\ [V_G(W) - V_B(0)] \leq C_B(0) - C_B(W) \quad \text{(A1)}$$

This set of inequalities can be met for some W smaller or equal to R as long as:

$$\zeta \leq \frac{C_B\ (0) - C_B\ (R)}{V_G\ (R) - V_B\ (0)} \quad \text{(A2)}$$

A continuum of separating equilibria may therefore obtain. In the separating equilibrium Pareto-dominating all other separating equilibria, the manager of the good firm reports therefore a discretionary provision W^*, where:

$$\zeta\ [V_G(W^*) - V_B(0)] = C_B(0) - C_B(W^*) \quad \text{(A3)}$$

A.2. Proof of Corollary 1

Let us assume that there is no asymmetry of information between the manager and the financial market about current operating earnings and that a separating equilibrium obtains. Prior to t_0, the market value of any firm is thus $pV_G(W) + (1-p)V_B(0)$. The good firm's market value prevailing at t_0, on the announcement date of the discretionary provision, is $V_G - C_G(W)$. The market reaction to the announcement of the discretionary provision is thus $(1-p)[V_G(W) - V_B(0)] > 0$.

A.3. Proof of Proposition 3

In this set of pooling equilibria, the managers of both the good and bad firms do report a discretionary provision W. By Bayes' rule, the posterior beliefs held by investors upon observing W have to be the same as their prior beliefs. The easiest way to support W as a pooling outcome is then to assign pessimistic beliefs to any out-of-equilibrium provision $\hat{W}$.[21] Let us therefore consider the following set of strategies and beliefs: the managers of both the good and bad firms do report a provision W and investors believe that any out-of-equilibrium provision $\hat{W}$ is reported by the manager of the bad firm. By deviating from his pooling strategy, the manager of any firm is thus perceived to be the manager of a bad firm. The utility of a deviating manager is maximised when $\hat{W} = 0$, that is, when he abstains from reporting any discretionary provision. By deviating from his pooling strategy and abstaining from reporting any discretionary provision, the manager of the good firm derives the following incremental utility:

$$C_G(0) - C_G(W) - \zeta\ [V_B(W) - V_B(0)] - \zeta p[V_G(W) - V_B(W)] \quad \text{(A4)}$$

By deviating from his pooling strategy and abstaining from reporting any discretionary provision, the manager of the bad firm derives the following incremental utility:

$$C_B(0) - C_B(W) - \zeta\ [V_B(W) - V_B(0)] - \zeta p[V_G(W) - V_B(W)] \quad \text{(A5)}$$

A necessary and sufficient condition for the managers of both types of firms not to deviate from their pooling strategies is therefore that:

$$p \geq \frac{C_B(0) - C_B(W) - \zeta\ [V_B(W) - V_B(0)]}{\zeta\ [V_G(W) - V_B(W)]} \quad \text{(A6)}$$

A.4. Proof of Proposition 5

A.4.1. Sequential equilibrium

Fudenberg and Tirole (1991) have shown that any perfect Bayesian equilibrium constitutes a sequential equilibrium in games in which each player has at most two possible types.

A.4.2. D1 criterion

We first prove that no pooling equilibrium, in which the managers of both good and bad firms do report a discretionary provision W, with $W < R$, satisfies the D1 strategic refinement designed by Cho and Kreps (1987). Let us therefore assume that such a pooling equilibrium does obtain and consider an out-of-equilibrium provision $\hat{W}$ in the neighbourhood of W, where $W < \hat{W} < R$. We then define $\hat{V}_G$ so as to satisfy the following equality:

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[21] Bayes' rule does not put any restrictions on the posterior beliefs held by investors upon observing an out-of-equilibrium provision $\hat{W}$.

$$C_G(\hat{W}) + \zeta \hat{V}_G = C_G(W) + \zeta\,[pV_G(W) + (1-p)\,V_B(W)] \quad \text{(A7)}$$

Similarly, we define $\hat{V}_G$ so as to satisfy the following equality:

$$C_B(\hat{W}) + \zeta \hat{V}_B = C_B(W) + \zeta\,[pV_G(W) + (1-p)\,V_B(W)] \quad \text{(A8)}$$

By combining both equalities, we obtain the following equality:

$$\zeta\,(\hat{V}_G - \hat{V}_B) = [C_G(W) - C_G(\hat{W})] - [C_B(W) - C_B(\hat{W})] \quad \text{(A9)}$$

From the previous equality, it is clear that $\hat{V}_G < \hat{V}_B$ since $\hat{W} > W$. The set of market responses Ω_B and Ω_G inducing the managers of the bad and good firms to defect from their equilibrium actions are therefore $\Omega_B = (\hat{V}_B, V_G(\hat{W})]$ and $\Omega_G = (\hat{V}_G, V_G(\hat{W})]$ and it is clear that $\Omega_B \subset \Omega_G$. When faced with the out-of-equilibrium provision $\hat{W}$, investors should therefore believe that it was reported by the manager of the good firm. But, these beliefs induce the manager of the good firm to defect from his equilibrium strategy. No pooling equilibrium, in which both good and bad firms do report a discretionary provision $W < R$, can therefore survive Cho and Kreps' D1 criterion. Similar arguments can be used to prove that the pooling equilibrium, in which the managers of both the good and bad firms abstain from reporting discretionary provision, does not survive this criterion.

We now prove that no non-efficient separating equilibrium can survive Cho and Kreps' D1 criterion. Let us therefore consider a separating equilibrium in which the equilibrium provision W reported by the manager of the good firm exceeds W^*. Whatever the response of the financial market, no bad firm would ever want to report an out-of-equilibrium provision $\hat{W}$ in the neighbourhood of W, where $\hat{W}^* < W < W$. This is so because W^* is the value of the provision for which the manager of the bad firm is indifferent between playing his equilibrium strategy and being identified as the manager of a bad firm, and reporting W^* and being identified as the manager of the good firm. The manager of the good firm may however find it incentive compatible to report $\hat{W}$. Let us define $\hat{V}_G$ so as to satisfy the following equality:

$$C_G(\hat{W}) + \zeta \hat{V}_G = C_G(W) + \zeta\,[V_G(W)] \quad \text{(A10)}$$

The sets of market responses Ω_B and Ω_G inducing the managers of the bad and good firms to defect from their equilibrium actions are therefore $\Omega_B = \phi$ and $\Omega_G = (\hat{V}_G, V_G(\hat{W})]$ and it is clear that $\Omega_B \subset \Omega_G$. When faced with the out-of-equilibrium provision $\hat{W}$, investors should therefore believe that it was reported by the manager of the good firm. But, these beliefs induce the manager of the good firm to defect from his equilibrium strategy. No non-efficient separating equilibrium can therefore survive Cho and Kreps' D1 strategic refinement.

We now prove that the efficient separating equilibrium survives Cho and Kreps' D1 criterion. To do this, we have to consider two potential types of defections $\hat{W}$:

i) $0 < \hat{W} < W^*$
ii) $W^* < \hat{W}$

i) Let us first consider a defection $\hat{W}$, where $0 < \hat{W} < W^*$. We already know that, in equilibrium, the manager of the bad firm is indifferent between his equilibrium action and that of the manager of the good firm. More formally:

$$C_B(0) + \zeta\,[V_B(0)] = C_B(W^*) + \zeta\,[V_G(W^*)] \quad \text{(A11)}$$

Let us define $\hat{V}_G$ so as to satisfy the following equality:

$$C_G(\hat{W}) + \zeta \hat{V}_G = C_G(W^*) + \zeta\,[\hat{V}_G(W^*)] \quad \text{(A12)}$$

Similarly, let us define $\hat{V}_B$ so as to satisfy the following equality:

$$C_B(\hat{W}) + \zeta \hat{V}_B = C_{\mathrm{B}}(0) + \zeta\,[V_B(0)] \quad \text{(A13)}$$

By combining the three equalities, we obtain:

$$\zeta\,(\hat{V}_G - \hat{V}_B) = [C_G(W^*) - C_G(\hat{W})] - [C_B(W^*) - C_B(\hat{W})] \quad \text{(A14)}$$

From the previous equality, it is clear that $\hat{V}_G > \hat{V}_B$ since $W^* > \hat{W}$. The sets of market responses Ω_B and Ω_G inducing the managers of the bad and good firms to defect from their equilibrium actions are therefore $\Omega_B = (\hat{V}_B, V_G(\hat{W})]$ and $\Omega_G = (\hat{V}_G, V_G(\hat{W})]$, and it is clear that $\Omega_G \subset \Omega_B$. When faced with an out-of-equilibrium provision $\hat{W}$, investors should therefore believe that it was reported by the manager of the bad firm. But, given these beliefs, no manager wishes to defect from his equilibrium strategy.

ii) Alternatively, let us consider a defection $\hat{W}$, where $W^* < \hat{W}$. Even if investors believe with probability one that the defector is a good firm, no firm will ever wish to defect.

It has been shown that no firm will ever wish to defect. The efficient separating equilibrium thus satisfies Cho and Kreps' D1 strategic refinement.

A.4.3. Ultimate Divinity and NWBR

Cho and Sobel (1990) show that, for any monotonic signalling game, criteria D1, NWBR, and universal divinity are equivalent.

A.5. Proof of Proposition 6

Let us first show that no separating equilibrium, in which the manager of the good firm chooses to report a discretionary restructuring provision $\overline{W}$ and the manager of the bad firm chooses to report a discretionary restructuring provision $\underline{W}$, with $\underline{W} < \overline{W}$, can possibly obtain. By deviating from his equilibrium strategy and pooling with the manager of the good firm, the manager of the bad firm gains the following incremental utility: $C_B(\overline{W}) - C_B(\underline{W}) + \zeta[V_G(\overline{W}) - V_B(\underline{W})]$, which is strictly positive. No separating equilibrium, in which the manager of the good firm chooses to report a discretionary restructuring provision $\overline{W}$ and the manager of the bad firm chooses to report a discretionary restructuring provision $\underline{W}$, with $\underline{W} < \overline{W}$, can thus possibly obtain.

We then show that no separating equilibrium, in which the manager of the good firm chooses to report a discretionary restructuring provision $\underline{W}$ and the manager of the bad firm chooses to report a discretionary restructuring provision $\overline{W}$, with $\underline{W} < \overline{W}$, can possibly obtain. By deviating from his equilibrium strategy and pooling with the manager of the bad firm, the manager of the good firm gains the following incremental utility: $C_G(\overline{W}) - C_G(\underline{W}) + \zeta[V_B(\overline{W}) - V_G(\underline{W})]$. Similarly, by deviating from his equilibrium strategy and pooling with the manager of the good firm, the manager of the bad firm gains the following incremental utility: $C_B(\underline{W}) - C_B(\overline{W}) + \zeta[V_G(\underline{W}) - V_B(\overline{W})]$. For this separating equilibrium to obtain, the following inequalities must thus hold:

$$C_G(\overline{W}) - C_G(\underline{W}) < \zeta\,[V_G(\underline{W}) - V_B(\overline{W})] < C_B(\overline{W}) - C_B(\underline{W}) \qquad \text{(A15)}$$

Since $C_G(\overline{W}) - C_G(\underline{W}) > C_B(\overline{W}) - C_B(\underline{W})$, these inequalities however cannot hold. No separating equilibrium, in which the manager of the good firm chooses to report a discretionary restructuring provision $\underline{W}$ and the manager of the bad firm chooses to report a discretionary restructuring provision $\overline{W}$, with $\underline{W} < \overline{W}$, can thus possibly obtain.

A.6. Proof of Proposition 8 and Corollary 3

Riley (1979) provides a number of conditions guaranteeing both the existence and the uniqueness of an equilibrium valuation schedule. The first part of this proof establishes that the model introduced in this paper meets the six conditions identified by Riley. The second part establishes conditions in which the equilibrium valuation schedule can be implemented, that is, the equilibrium discretionary restructuring provision reported by the manager of the highest quality firm does not exceed R. The third part establishes that the abnormal share price reaction to the disclosure of a discretionary restructuring provision is strictly increasing in the size of the provision.

A.6.1. Riley conditions

Using Riley's notations, the manager's objective function may be rewritten as:

$$I\,(q,\, r,\, I^M) = I^D\,(q,\, r) + \zeta I^M \qquad \text{(A16)}$$

with $I^D(q,r) \equiv C_q(r)$ and $I^M \equiv V_{q(r)}(r)$. Riley's conditions for the existence of a unique equilibrium valuation schedule can then be expressed as follows:

1. The unobservable parameter q is distributed on a closed interval according to a strictly increasing distribution function;
2. The functions $I(.)$ and $I^D(.)$ are infinitely differentiable in all variables;
3. $\frac{\partial I}{\partial I^M} > 0$;
4. $I^D\,(q,\, r) > 0,\ \frac{\partial I^D\,(q,\, r)}{\partial_q} > 0$;

5 When $I_2 \equiv \frac{\partial I}{\partial r}$ and $I_3 \equiv \frac{\partial I}{\partial I^M}$, the partial derivative of $-\frac{I_2}{I_3}$ with respect to q is negative;

6. $I\,[q,\, r,\, I^D(q,\, r)]$ has a unique maximum over r.

The first four conditions are trivially satisfied. The fifth condition is satisfied because:

$$\frac{\partial}{\partial q}\left(-\frac{I_2}{I_3}\right) = -\frac{\partial^2 C_q\,(r)}{\partial q \partial r} < 0 \qquad \text{(A17)}$$

The sixth condition is satisfied since the only maximum of $I\,[q,\, r,\, I^D(q,\, r)]$ is $r = 0$. As Riley's conditions are satisfied, there exists a unique equilibrium valuation schedule $q(r)$.

A.6.2. Implementation

From the First Order Condition, one can show that the valuation schedule $q(r)$ satisfies the following equality:

$$\left.\frac{dq\,(r)}{dr}\right|_{r=r^*(q)} = -\frac{\left.\frac{\partial C_q\,(r)}{\partial r}\right|_{r=r^*(q)} + \zeta \left.\frac{\partial V_{q(r)}\,(r)}{\partial r}\right|_{r=r^*(q)}}{\zeta \left.\frac{dV_q}{dq}\right|_q} > 0 \qquad \text{(A18)}$$

The equilibrium valuation schedule is thus strictly increasing in the size of the provision. It can also be implemented as long as the number of stock-options the manager is endowed with is small enough since:

$$\lim_{\zeta \to 0} \frac{dr^*(q)}{dq} = 0 \quad \forall q \qquad \text{(A19)}$$

Proposition 8 thus obtains.

A.6.3. Abnormal returns

By rewriting the First Order Condition, one obtains the following inequality:

$$\zeta \frac{dV_{q(r)}(r)}{dr} = -\frac{dC_q(r)}{dr}\bigg|_{r=r^*(q)} \qquad \text{(A20)}$$

$$> 0$$

Corollary 3 thus obtains.

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The revaluation of assets as a signalling device: a theoretical and an empirical analysis

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Abstract—In many countries, firms can choose whether or not to report a revaluation in the financial statements. An analytical model is developed to indicate conditions in which it is more likely that successful firms will choose not to revalue assets as a credible signal to potential investors. These industry settings include a high variance in performance and low equity-to-debt ratios. The empirical results for Belgium confirm that successful firms are less likely to revalue assets in those industries. However, only the revaluation of fixed tangible assets and not financial assets seems to be a credible signal. Finally, the results support the choice to revalue, but not the amount of revaluation, as a signalling device.

1. Introduction

Accounting laws in many countries, such as the UK, Australia and Belgium, allow for the revaluation of tangible fixed and financial assets in the annual accounts. Managers have the discretionary power whether or not to report a revaluation of assets. Subject to the true and fair view requirements of the financial statements, the amount of revaluation recognised in the accounts is also a choice variable.

Previous accounting studies (Brown, Izan and Loh, 1992; Whittred and Chan, 1992; Lin and Peasnell, 1994; Cotter and Zimmer, 1995) concentrate on contractual relationships to explain the decision to revalue assets or not. Highly leveraged firms, which are close to, and want to avoid, default on their debt covenants, are more likely to revalue assets. A decreased borrowing capacity, measured by lower cash flows than in the previous period, increased secured borrowing and high leverage, all encourage firms to revalue assets. If a revaluation is undertaken other than at the balance sheet date, it tends to be associated with debt contracting.

In these empirical studies firms that revalue assets are found to be larger, and to have larger property holdings and lower market-to-book values. The signalling motive for revaluing assets has not been central to the work so far. An exception is Lin and Peasnell (1994), who propose the hypothesis that revaluation of assets is a positive signal of future cash flows because it results in a decrease in the return on equity. Only when firms have positive inside information and shares are undervalued will they be prepared to carry the costs of a decrease in the return on equity. This hypothesis was not confirmed by their evidence. Other studies which analysed the abnormal returns on the stock exchange after a revaluation of assets yielded mixed results (Easton, Eddey and Harris, 1993; Standish and Ung, 1982; Emanuel, 1989).

This paper develops and tests an analytical model of the signalling function of the revaluation decision in an environment where firms are not quoted on a stock exchange, but have to obtain funds elsewhere. The environment modelled is one where the financial position of a company determines the probability of raising funds for new investments, while at the same time affecting the probability of reorganisation. The revaluation of assets is found to be a negative signal. Poorly performing firms benefit more from revaluing assets. Since these firms have a smaller net worth, they have a larger probability of violating the legal requirements with respect to their net worth. Because the net worth increases when assets are revalued, badly performing firms can cut their expected reorganisation costs substantially by an asset revaluation. However, in a world of incompletely informed investors, as the revaluation reduces the return on equity, poorly performing

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firms that revalue will have more difficulty attracting new funds.

If investors believe that the revaluation of assets is a negative signal, then it is less likely that funds will be provided for an investment project or they will be provided only at a higher cost. This results in a decrease in the expected cash flows to equity of the project. Because successful firms realise larger future cash flows, the increase in the expected cash flows from not revaluing is larger for these firms, while at the same time the increase in expected reorganisation costs from not revaluing are lower. As a consequence, not revaluing assets can be a powerful mechanism used by successful firms to signal their success, which is reflected in their higher future cash flows. The non-revaluation of assets can serve as a positive signal, but not in all circumstances. Industry characteristics most favourable for signalling are shown to be a high variance in performance and low equity-to-debt ratios.

These analytical insights are empirically tested using Belgian data. Some evidence is found for the signalling hypothesis. Successful firms are more likely not to revalue assets only in industries with a high variance in performance and low equity-to-debt ratios. They can signal their success by not revaluing because the signalling cost, measured by the closeness to the constraints in their legal covenant, is smaller for the successful firm. Further, signalling can only be done by not revaluing fixed tangible assets and not by revaluing financial assets.

The paper is organised as follows. In Section 2 the institutional environment is described. In Section 3 the signalling model is developed. Univariate and multivariate tests are presented in the empirical analysis of Section 4, and Section 5 contains the conclusions.

2. Institutional background

In Belgium, the shares of only a minority of companies (about 40) are traded on the Belgian Stock Exchange. However, interested parties of closely held firms have access to the financial statements, which are publicly available, as an information source.[1] Shareholders use the information provided in the financial statements to determine the price when they occasionally sell shares. Firms also raise capital to finance growth. If a Belgian firm issues new shares, the price is fixed and the shares are more easily sold as the prospects of the firm are better. The supply of new funds and the interest rate charged by banks also depend on the information supplied in the financial statements. Further, the tax law uses the financial statements as the tax base.[2] A certain accounting method chosen for tax purposes is only allowed when it is also used to prepare the financial statements.

Finally, the company law uses the financial statements to determine whether a firm can distribute dividends or is insolvent. A firm is insolvent when its net worth, defined as total assets less total liabilities, is smaller than half of the capital.[3] If a firm violates this legal covenant, the general board of the firm has to develop a reorganisation plan or end the activities of the firm (Art. 103 and 104, Company Law). If the net worth is smaller than the minimum level of capital, any stakeholder (auditor, debt holders, owners, banks, etc.) can demand the company be made bankrupt. The financial statements also determine the amount of dividends. A firm can only distribute profits when the net worth, defined as [total assets − total liabilities − value of the intangible assets (excluding the value of the set up costs)],[4] is larger than the value of capital and the unavailable reserves[5] (Art. 77 bis Company Law).

When companies raise capital or seek new funds from banks, accounting information and accounting choices, which can inform the investors or suppliers of funds about the performance of the firm, are even more important than in other countries because share prices are not readily available. One such accounting choice is whether to revalue the assets.

The Belgian accounting law allows the revaluation of fixed tangible and financial assets. Firms may revalue fixed tangible assets when their economic value, determined on the basis of their use by the firm, is permanently larger than their book value. Since no precise rules are prescribed for the revaluation of assets, managers can exercise discretion whether or not to report an increase in the book value of the assets.[6] The revaluation of fixed assets is more discretionary than the revaluation of financial assets. If a subsidiary company does not realise profits or distribute all profits, the book value of the parent company's financial assets cannot be increased. In addition, the revaluation of the parent's financial assets does not supply any new information to third parties, because it is already disclosed in the financial statements of the subsidiary.

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[1] All firms of which the owners have limited liability have to make their financial statements publicly available at the National Bank.

[2] The information in the financial statements (reporting methods chosen, the amount of provisions, the depreciation amounts) is also used for tax purposes. If an accounting method is used for reporting purposes, it must also be used for tax purposes. The distribution of the income after taxes is shown in the balance sheet: the part of the income which will be distributed to the different stake holders is part of the short term debt, and the undistributed profits are part of the equity.

[3] The capital of a firm is the amount of resources supplied by shareholders when the firm is funded. The other parts of a firm's equity are: the share premium, the revaluation reserve, the retained earnings, the accumulated profit and the investment grants.

[4] The set-up costs and the intangible assets are excluded from the net worth to avoid the situation where firms are able to distribute dividends only by capitalising these costs.

[5] An unavailable reserve must be formed when the company buys shares from its own shareholders (Art. 52 bis, 72 bis and 128 bis of the Company Law). The shares bought are recorded as short term cash investments. After some time, these shares are usually cancelled. Compared to the distribution of dividends, the shareholders receive an income without paying taxes. To protect debt holders and to avoid a decrease in equity, this procedure is only allowed when the firm realises profits and an unavailable reserve can be built up, which cannot be distributed to the shareholders. When the shares are cancelled, the unavailable reserves as well as short term cash investments decrease by the same amount.

Compared to other countries, the revaluation of assets is highly discretionary in Belgium since the financial statements of small and medium sized firms are not audited independently. As the risk of litigation is almost non-existent, an auditor is less likely to disallow the revaluation of assets.

The revaluation of assets results in increases in the book values of fixed assets and the revaluation reserve, which is part of the owner's equity (Art. 34 Royal decree 8 October 1976). If firms revalue fixed tangible assets, the revalued assets must be depreciated over their remaining life. Hence, the revaluation of fixed tangible assets (except land) results in a decrease in accounting profits of future periods.[7] Nevertheless, depreciation of the revalued amounts is not allowed by the tax authorities (Art. 24, Fiscal Law, Art. 44, 1°). Consequently, reduced taxes can never be the reason for revaluing assets. However, some legal requirements can be met more easily by revaluing assets (Company Law, Article 77 bis, 103 and 104). If a firm revalues assets, its net worth increases and the legal covenant, defined as ([total assets − total liabilities] > 1/2 capital])[8] can be met more easily and the probability of insolvency decreases.

The next section develops an analytical model to explain the revaluation of assets as a signalling device, taking into account the institutional framework in which firms raise funds in an environment without a stock market and where accounting information determines the legal definition of an insolvent company. This implies that only the book value of the shares is available to the capital market, where firms raise new capital and shareholders trade shares.

3. The model

As in the typical signalling models of corporate investment (cf. e.g. Meyers and Majluf, 1984), managers are assumed to possess inside information about projects for which they seek financing. The receiving party is a potential investor, uninformed as to the expected success of a project. In an environment of asymmetric information, the manager can reveal the success of the new project by using financial signals: for instance the level of debt (Ross, 1977), the level of debt together with the manager's share of equity (Leland & Pyle, 1977) or the dividend level (Bhattacharya, 1979; 1980; Kose and Williams, 1985; Miller and Rock, 1985). Accounting signals (the type of the auditor, Titman and Trueman, 1986; the inventory method, Hughes and Schwartz, 1988) can also inform potential investors about the success of a new project. In this paper the signal is the revaluation of assets. After observing this accounting signal, i.e. observing whether or not the firm revalues its assets, investors decide on whether or not to invest in the project, which generates either high or low cash flows. The signalling function of the asset revaluation is studied in an environment where the current financial position and the expected success of the project determine the probability of raising funds for an investment.[9]

Given the absence of share prices for most firms, the probability that funds are received can be influenced but not the share price. As the current financial position improves (equity becomes higher relative to debt), investors have more confidence in the firm. As the new project is expected to be more successful, investors and shareholders are more willing to provide funds. This greater probability of raising funds results in larger expected cash flows.

The probability of not raising the funds given a fixed equity/debt ratio is assumed to be:

$$p^{nf}(\breve{s}_t) = \exp(-a(E/D + \breve{s}_t)) \qquad (1)$$

where:

$p^{nf}(\breve{s}_t)$: the probability that the money cannot be raised given investors believe that the firm realises $\breve{s}_t$ as cash flows;

$\breve{s}_t$: the cash flows from the project as perceived by investors. Two possible types t are considered: s_H (high cash flows) or s_L (low cash flows);

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[6] The accounting law does not define whether the revaluation amount should be determined by using the new purchasing cost or the resale value.

[7] The fixed tangible assets consist of plant, machinery and equipment; transportation and office equipment; and land and building. They can be separately identified in the financial statements. As land and building form one category, the depreciable and the non-depreciable tangible assets are indistinguishable.

[8] The legal covenant is calculated using the financial statements of the firm. Unlike the condition for dividend distribution, the set-up costs and intangible assets are not excluded since the legal covenant does not determine the distribution of profits.

[9] Alternatively, when a stock market exists, instead of focusing on the probability of raising funds, the beliefs of the investors can be modelled to influence the price or interest rate paid for the investment funds, yielding similar conclusions.

a: a constant parameter, reflecting the general economic situation;
E/D: the amount of equity before revaluation as a proportion of total debt.

The equity-to-debt ratio is similar for both types of firm (high or low future cash flows); and it is common knowledge. The higher E/D, the higher the probability of raising funds. In a complete information environment the amount of revaluation does not influence the probability of raising the funds for the project; but it does in the incomplete information environment that we model because the revaluation decision is assumed to determine investors' beliefs on the success of the firm, $\check{s}_t$.

Firms face a probability that they have to lay off employees, rearrange activities, and so forth, which typically involve reorganisation costs. The probability of a reorganisation is smaller when funds for the new project are obtained and when the current financial position is better. The probability of a reorganisation can be expressed as:

$$p^{re|f}_t(s_t,R) = \exp(-b((E+R)/D+s_t)) \qquad (2a)$$

where:

$p^{re|f}_t(s_t,R)$: the probability that a reorganisation is needed given that funds are acquired ($0 \leq p \leq 1$);
s_t: cash flows from the project for firms of type t with $t=H, L$;
R: the amount of revaluation, which varies between 0 and M;
b: a constant term.

Given that cash flows are realised only when funds can be obtained, we also need to define the probability of reorganisation in case of no funds.[10]

$$p^{re|nf}(R) = \exp(-b((E+R)/D)) \qquad (2b)$$

The total expected reorganisation costs, TER, are not only determined by the probability of a reorganisation $p^{re/f}$ and $p^{re/nf}$ but also by the probability of acquiring the funds $(1-p^{nf})$ and by the level of reorganisation costs. Those costs are assumed to be non-firm specific, fixed and equal to C.[11] The total expected reorganisation costs (TER) for each type of firm depends on the investor's beliefs on the firm's type and the amount of revaluation and on the probability that funds are provided.

$$TER_t(\check{s}_t, R) = ((1-p^{nf}(\check{s}_t))*p^{re/f}_t(s_t,R)+ p^{nf}(\check{s}_t)*p^{re/nf}(R))*C. \qquad (3)$$

A reasonable assumption is that the probability of a reorganisation is smaller if the funds are obtained than if they are not (this follows from 2a).

Compared to other accounting methods, e.g. the choice of FIFO or LIFO or linear or accelerated depreciation, the financial outcome of the revaluation decision need not be discrete but can be continuous from zero up to the maximum level M, where M is the maximum amount allowed by a true and fair view in the financial statements. Firms not only have to decide whether to revalue their assets but must also determine the amount of the revaluation. In a *complete information environment*, as the amount of the revaluation increases, the expected reorganisation costs decrease, and all firms have an incentive to revalue assets to minimise the total expected reorganisation costs, TER. It is straightforward to show that the first-order derivative of the total reorganisation costs with respect to R is negative. ($\partial TER/\partial R = -b/D*TER < 0$) Therefore, all firms have an incentive to revalue assets by the maximum amount of M (see Figure 1).

The classical contractual hypothesis in a complete information environment can likewise be identified: the lower the equity-to-debt ratio of a firm, E/D, the steeper the decline in expected reorganisation costs due to R ($\partial^2 TER/\partial R.\partial E/D > 0$ given that $\partial TER/\partial E/D < 0$).

In an *incomplete information environment*, the successful firms can only reveal their type by choosing an amount of revaluation which is smaller than the maximum ($R1 < M$). If investors observe a smaller amount of revaluation in a separating equilibrium, they correctly update their beliefs that the revaluer is a successful firm, s_H. For the firm of type H, the probability of receiving funds increases. As a smaller amount of revaluation results in a larger probability of raising the funds, the expected cash flows increase by $s_H*(e^{-a(E/D+\check{s}_t)} - e^{-a(E/D+\check{s}_H)})$. As the cash flows realised are larger for the successful firm, those firms gain more by choosing a smaller amount of revaluation.

At the same time, the amount of revaluation influences the level of expected reorganisation costs. If a firm revalues its assets by a smaller amount, the probability of receiving funds increases, which decreases the level of reorganisation costs. However, the choice of a smaller amount of revaluation results in a weaker financial position, which increases the level of expected reorganisation costs. As proposition 1 in the Appendix shows, the choice of a smaller amount of revaluation, $R1 < M$, results in a net increase in the expected reorganisation costs.

Since the probability of a reorganisation is a decreasing convex function of success, the choice of

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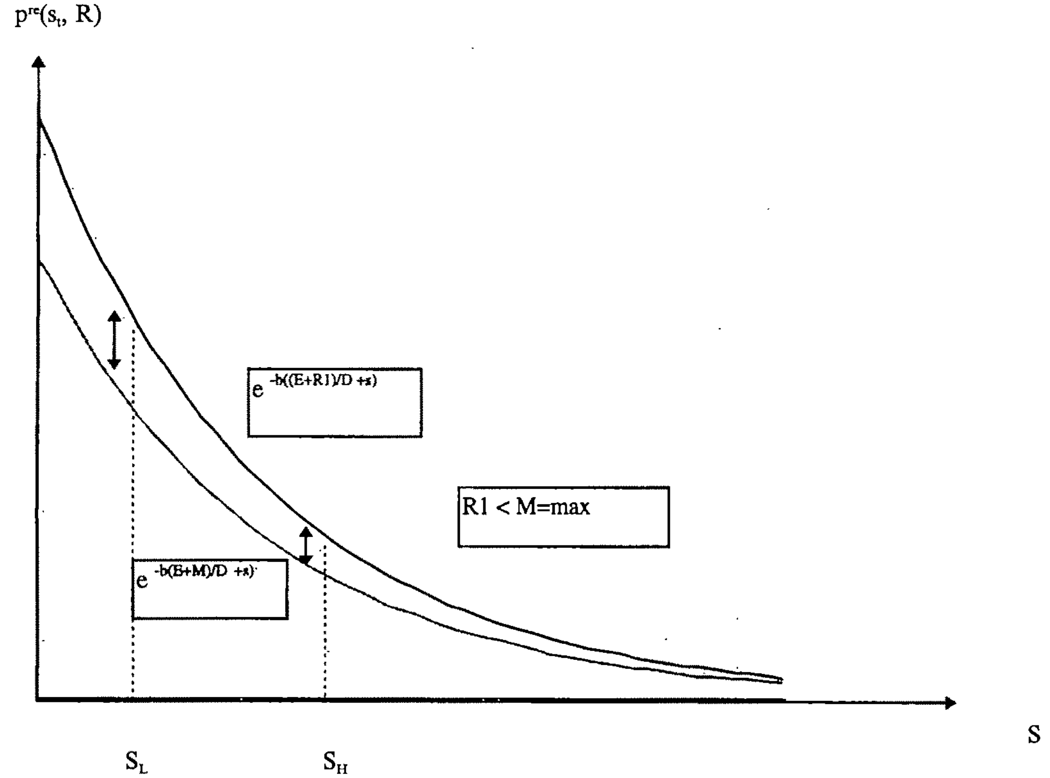
[10] By adding the probability of a reorganisation in the model, the idea of violating the legal covenant (Art. 103 and 104, Company Law) is introduced in a general way in the model. If a firm has a larger chance of a covenant default, the chance of a reorganisation is larger.

[11] The assumption of fixed reorganisation costs is a simplification. In reality, the size of reorganisation costs depends on the firm's value.

Figure 1
The effect of a revaluation on the probability of a reorganisation



a smaller amount of revaluation (R1 < M) results in a larger increase in the probability of reorganising and hence in the expected reorganisation costs for the unsuccessful firm (see Figure 1). The proof is in proposition 2 of the Appendix.

When the unsuccessful firm chooses a smaller amount of revaluation it faces a lower increase in expected cash flows and a larger increase in expected reorganisation costs compared to the successful firm. A separating outcome where the successful firm chooses a smaller amount of revaluation than an unsuccessful firm can now be a *sequential equilibrium*, where neither type of firm has an incentive to deviate and investors' beliefs are consistent. Proposition 3 in the Appendix (see condition A.3c) derives the optimal amount of revaluation for the successful firm:

$$R^* = D/b^*(\ln TER_L(\check{s}_H, 0) - \ln((p^{nf}(\check{s}_L) - p^{nf}(\check{s}_H))^* s_L + TER_L(\check{s}_L, M))$$

Due to asymmetric information the successful firm can only reveal its type by choosing an amount of revaluation, R* sufficiently smaller than M, that the unsuccessful firms cannot imitate.

The revaluation of assets can become a non-dissipative signal (Ross, 1977). The successful firm does not carry a cost from not revaluing the assets since the expected reorganisation costs equal zero, while the unsuccessful firm can avoid a reorganisation by revaluing the assets. As signalling by not revaluing the assets is costless for the successful firm, it is a powerful signal.

Any revaluation amount smaller than R* can also result in a separating equilibrium. But in this case the successful firm is not maximising its expected profits. As shown in the appendix, a dichotomous choice, where a successful firm would choose to not revalue at all, while the unsuccessful firm would choose to revalue the maximum amount M, can be a sequential equilibrium if the expected cash flows of the successful firm s_H are sufficiently large.

For the empirical analysis it is important to study which characteristics influence the probability of reaching a separating equilibrium, as well as the optimal amount of revaluation chosen by the firms. One characteristic that determines the net benefits of signalling is the difference in expected cash flows between the good and bad types. If the difference between the cash flows of the successful and the unsuccessful firm increases, both types of firm gain more from revaluing their assets by a smaller amount: not only does the increase in expected cash flows from signalling increase, but

Table 1
Characteristics of the sample

	1989	*1990*	*1991*	*1992*	*1993*	*1994*	*Total*
Non-revaluers	163	143	148	140	129	126	849
Revaluers of fixed tangible assets	27	22	21	10	22	37	139
Revaluers of financial assets	14	7	7	4	8	12	52
Total	204	171*	176	154	159	174*	1038

*In 1990 and 1994 one firm revalues fixed tangible as well as financial assets.

the increase in expected reorganisation costs is less (see proposition 4 in the Appendix). Therefore, in industries with large differences in performance the amount of revaluation chosen by the successful firms, R*, must be smaller to avoid imitation by the unsuccessful firms (the proof of this can be found in proposition 4 in the Appendix).

Furthermore, it can be shown that the increase in expected cash flows is larger for the successful firm, while the increase in expected reorganisation costs is lower for unsuccessful firms. Hence, the probability of establishing a separating equilibrium increases with a larger variance in expected performance, an empirically testable hypothesis. The more distinct the successful firm, the more incentive it will have to differentiate itself from other less successful firms in the industry, which it can do by revaluing less.

The initial equity-to-debt ratio, which the model assumes to be type-independent, likewise influences the costs and benefits of revaluing by less as a signalling device. As the initial equity-to-debt ratio is higher, the increase in the expected cash flows from signalling becomes less important. Hence, revaluing less to signal success becomes less attractive. But at the same time, a higher equity-to-debt ratio leaves a smaller increase in expected reorganisation costs due to signalling, making signalling less costly. As the signalling cost and the signalling revenue have confounding effects, no precise outcome can be predicted. Also the effect on R* is ambiguous (see proposition 5 in the Appendix). However, for the successful firm the signalling revenue reduction effect is larger and the cost-dampening effect is smaller than for the unsuccessful firm. This means that a separating equilibrium can be reached for fewer combinations of s_H and s_L. Consequently, in industries with higher equity-to-debt ratios, the successful firm becomes less likely to signal its type by revaluing by a smaller amount.

4. Empirical analysis

A sample of Belgian industrial companies was selected to test hypotheses originating from the theoretical model. The analysis focuses on three major industries: chemicals, metals and construction.[12] The sample consists of 189 revaluers and 847 non-revaluers, randomly selected over the period 1989–1994, none of these firms being listed on the Belgian Stock Exchange.[13] The sampling procedure is subject to the constraints that the relative share of the industry in the economy in each year is reproduced and that no firm is included more than once in the sample.[14] Further, only consistent non-revaluers are retained: firms that did not revalue in a certain year but did so in another year during the period 1989–1994 are excluded from the class of non-revaluers. Finally, firms are retained only when they are in business, i.e. when the number of employees is larger than zero. The data source consists of the annual accounts published. Table 1 gives an overview of the sample characteristics. Besides signalling motives for (not) revaluing, the influence of contracting costs is included in the empirical analysis.

4.1. Hypotheses

The theoretical model generates a number of signalling hypotheses that can be tested empirically. A critical variable determining the use of revaluation as a signalling device is the expected success of the firm. A first issue is how to measure (expected) success. Since most of the firms are not listed on the stock exchange, the market-to-book value cannot be used as a measure of success. Instead, the ratio of future cash flows to fixed assets[15] is chosen to proxy success, where the fixed assets are measured before revaluation.[16] The cash flows realised in the next year are used to measure future performance.[17] The theoretical section shows that if future cash flows are higher, the benefit from not revaluing the assets is higher.[18]

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[12] The industry sectors are: the production and preliminary processing of metals (nace 22), the extraction of minerals other than metalleferious and energy-producing minerals, peat extraction (nace 23), manufacture of non-metallic mineral products (nace 24), chemical industry (nace 25), the manufacture of pharmaceutical products, manufacture of soap, synthetic detergents, perfume and toilet preparation (nace 257 and nace 258), manufacture of metal articles (nace 31), mechanical engineering (nace 32), manufacture of office machinery and data processing machinery (nace 33), electrical engineering (nace 34), manufacture of motor vehicles and motor vehicles parts (nace 35), manufacture of other means of transport (nace 36), instrument engineering (nace 37) and building industry (nace 50).

[13] As in the study of Wittred and Chan (1992) and Cotter and Zimmer (1995) a period of five years is chosen so that the results would not be time specific. Contrary to Cotter and Zimmer (1995), the financial statements do not mention who did the revaluation (independent or director's revaluation) or the date of the revaluation.

[14] Multiple revaluers over the period 1989–1994 are initially excluded from the sample.

The model predicts that the characteristics of the industry in which the firm is active have a significant impact on the firm's incentives to signal success. A separating equilibrium is more likely to be reached in industries with a high variance in performance. This results in the following hypothesis:

> H1: In industries with a high variance in performance, successful firms are less likely to revalue assets than are unsuccessful firms.

Similarly, the equity-to-debt ratio influences the incentive to use revaluation as a signalling device. Although it is theoretically unclear whether firms are more or less likely to revalue in industries with high equity-to-debt ratios, the model does predict that in industries where the equity-to-debt ratio is lower, successful firms are more likely to signal their success by revaluing less.

> H2: In industries with low equity-to-debt ratios, successful firms are less likely to revalue assets than unsuccessful firms.

The results of the model show that the signalling cost, i.e. the increase in the expected reorganisation costs when not revaluing the assets, is larger for the unsuccessful than for the successful firm. The firm's closeness to the legal covenant, defined as (net worth less the amount of capital), is used to measure its signalling cost.[19] As the firm is closer to violation, the signalling cost from not revaluing its assets is higher. This results in the following hypothesis:

> H3: If a firm violates the legal requirement or is close to violation, the probability of a revaluation increases as its net worth becomes smaller.

For firms which have a large net worth and where the probability of violation is small, H3 is irrelevant. Hence, where firms are not close to violation, changes in their net worth should not influence their decision to revalue. The introduction of the legal covenant variables simultaneously includes the influence of debt contracts on the revaluation decision. For firms with large reserves and retained earnings, the possibility of violating debt covenants is smaller.[20]

Not only the amount of debt but its composition could influence the decision to revalue assets. An interesting hypothesis is whether non-revaluation is a more or less effective signal where the debt is held by banks rather than other debt holders.

> H4: As the share of the debt owed to banks increases, firms are more or less likely to revalue their assets.

Besides these signalling hypotheses the influence of the traditional motives for revaluation, such as contractual relationships, is also examined (Watts and Zimmerman, 1990). This allows us to test whether, after controlling for these factors, signalling has incremental value in explaining the choice to revalue assets.

To measure the political visibility of the sample firms two alternatives are available: sales and the seller concentration in the industry as proxied by the Herfindahl index. Other variables are less suitable in the present environment; for example, because the revaluation of assets does not affect taxes, the tax rate cannot be used as an explanatory variable. The idea is that larger firms or firms in more concentrated industries have a larger incentive to revalue fixed tangible assets, which decreases reported income and hence diminishes political visibility. Size is also used in other studies (Lin and Peasnell, 1994; Brown et al. 1992) where it is proxying for other influences such as experience with opportunities available for creative accounting (but within the confines of accounting standards). Therefore, both size and the Herfindahl index are introduced in the model. This results in the following hypotheses:

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[15] The term 'cash flows' as used in the text means cash flows from operations.

[16] This ratio is preferred over cash flows to equity, since equity is distorted by past performance and dividend policy.

[17] As an extension of the basic model, the positive news is not only measured by the level of future cash flows but also by the increase in cash flows, measured as a percentage and a dummy variable.

[18] Future cash flows as well as growth in cash flows have the disadvantage that they will (partly) be the result of the signalling strategy. The sensitivity of the results is checked with the alternative of current cash flows as a proxy of future performance. Ideally, the incremental increase in cash flows/fixed assets should be treated as the dependent variable. This however requires an in-depth study of performance determinants, among which signalling is but one. This clearly moves beyond the scope of the study reported here.

[19] The legal covenant itself, the (net worth—1/2 capital) is not used as an independent variable, since firms do not wait to revalue assets until they violate their covenant. The use of other than legal covenants is more problematic to assess. Neither the covenants nor the instances of their violation are published in the notes to the financial statements. Further, most of the covenants are implicit. The use of a legal covenant does not create the same problems. It exists for all firms and their closeness to violation can be determined from the balance sheet.

[20] The debt/equity ratio cannot be added directly into the regression equation because of its high correlation with other independent variables.

H5: Larger firms are more likely to revalue assets.

H6: Firms in highly concentrated industries are more likely to revalue assets.

Firms with larger investments in fixed and financial assets have more opportunities to revalue.[21] As in other studies (Brown et al., 1992; Lin and Peasnell, 1994), the ratio (fixed tangible +financial assets)/total assets is introduced to control for this effect.

H7: As the investment in financial and fixed assets increases, firms are more likely to revalue assets.

Table 2 summarises the explanatory variables and their expected signs. Two dependent variables are used: the discrete choice to revalue and the continuous choice of the magnitude of revaluation. For the discrete choice, a dichotomous (0,1) variable is created that takes the value of 1 if the firm revalues, and 0 otherwise. For the continuous choice, the amount of revaluation as a % of fixed assets before revaluation is used.

4.2. Results

Before presenting the regression results, some univariate tests are presented.

4.2.1. Univariate tests

As these financial ratios are not normally distributed, the non-parametric Van der Waerden test (Sprent, 1995) is used to identify any possible difference in financial ratios between companies that choose to revalue and those companies not revaluing.[22] The results of this univariate test are shown in Table 3.

The univariate tests suggest that industry characteristics could influence the possibility to signal success by non-revaluation of assets. When the performance of the firm is measured by the improvement in cash flows in the next period, non-revaluers realise a higher increase in cash flows but only in industries with a high variance in performance (INCDV_{H}, $p=0.0001$, INCDV_{L}, $p=0.4552$). The use of dummy variables to measure the increase in performance also gives the expected result (DINCDV_{H}, $p=0.0001$, DINCDV_{L}, $p=0.6623$). Interestingly, the variable CF_{NEXT} is significantly higher for non-revaluers in both types of industry ($\text{CF}_{\text{NEXT}}\text{DV}_{\text{H}}$, $p=0.0001$, $\text{CF}_{\text{NEXT}}\text{DV}_{\text{L}}$ $p=0.0004$). Likewise, in industries with a low as well as high equity-to-debt ratios, the non-revaluers perform significantly better than the revaluers ($\text{CF}_{\text{NEXT}}\text{DE}_{\text{L}}$ $p=0.0041$, $\text{CF}_{\text{NEXT}}\text{DE}_{\text{H}}$, $p=0.0001$).

Similarly, along the closeness to the legal covenant dimension, both types of company perform differently. Non-revaluers have a higher net worth, expressed as a share of their capital compared to revaluers. This holds irrespective of whether firms are close to the legal covenant or not (DLAWA $p=0.0001$, DLAWB, $p=0.0001$). Further, revaluers are typically larger (S, $p=0.0001$). Finally, neither the relative importance of fixed and financial assets (FFA/TA, $p=0.1288$) nor the Herfindahl index (HF,$p=0.5379$) is significantly different between the revaluers and the non-revaluers, while the share of debt owed to banks is significantly larger for revaluers (DOB, $p=0.0042$), which is different from what is expected.

4.2.2. Multivariate tests

In the multivariate analysis the joint power of the independent variables in explaining the revaluation decision is tested. First, the discrete choice problem whether or not to revalue, is studied. As the dependent variable is either a 1 or 0, a logistic regression is used. The results are shown in Table 4 (Models 1–4). Also included in Table 4 are the OLS results for the amount of revaluation as a percentage of fixed assets before revaluation, which is a continuous dependent variable (Model

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[21] If a firm revalued its assets in the past, the assets will also be larger but the possibility to revalue will be smaller since the difference between the economic value and the book value is smaller. As all firms are revalued more than once over the period 1989–1994 are excluded from the sample, this effect is partly controlled.

[22] The Van der Waerden test is preferred above other non-parametric tests because it asymptotically has the same power as a t-test for normally distributed variables. The probability that the null hypothesis is falsely rejected is smaller than when other non-parametric tests are used. The Van der Waerden test computes approximate standard normal scores derived by applying the inverse standard normal distribution function to fractional ranks $a(R_j)=\phi^{-1}(R_j/(n+1))$, where R_j is the rank of the jth observation, $a(R_j)$ is the rank score ϕ^{-1} is the inverse of the standard normal distribution and n is the number of observations. The Van der Waerden scores are approximations of the expected values of the order statistics for a standard normal distribution.

Table 2
Description of the variables and the hypotheses

Variable	C = company level I = industry level	*Description*	*Hypothesis*	*Expected sign*
R	C	A dummy if the firm revalues assets; otherwise zero		
CF_{NEXT}/FA	C	Cash flows realised in $_{t+1}$/ (fixed assets before revaluation$_{t+1}$)		
INC	C	$(CF_{NEXT}/FA - 1)/(CF_t/FA_t)$		
DV_H	I	A dummy if the variance in performance in the industry is high; otherwise 0[28]		
DV_L	I	A dummy if the variance in performance in the industry is low; otherwise 0; $DV_L = 1 - DV_H$		
$CF_{NEXT}DV_H$	C	$CF_{NEXT}/FA*DV_H$: The CF/FA in industries with a high variance in performance	H1	–
$CF_{NEXT}DV_L$	C	$CF_{NEXT}/FA*DV_L$: The CF/FA in industries with a low variance in performance	H1	0
$INCDV_H$	C	$INC*DV_H$: The increase in CF/FA in industries with a high variance in performance	H1	–
$INCDV_L$	C	$INC*DV_L$: The increase in CF/FA in industries with a low variance in performance	H1	0
DINC	C	Dummy which is 1 with an increase in CF/FA; else 0		
$DINCHDV_H$	C	$DINC*DV_H$: The increase in CF/FA (dummy) in industries with a high variance in performance	H1	–
$DINCHDV_L$	C	$DINC*DV_L$: the increase in CF/FA (dummy) in industries with a low variance in performance	H1	0
DEH	I	A dummy = 1 if the equity-to-debt ratio in the industry is high, otherwise zero[29]		
DEL	I	A dummy = 1 if the equity-to-debt ratio in the industry is low, otherwise zero; DEL = 1 − DEH		
$CF_{NEXT}DE_H$	C	$CF/FA*DE_H$: The CF/FA in industries with a high equity-to-debt ratio	H2	0
$CF_{NEXT}DE_L$	C	$CF/FA*DE_L$: The CF/FA in industries with a low equity-to-debt ratio	H2	–
DLAWA	C	The closeness to the covenant expressed as (the net worth/the amount of capital − 1) for firms, which have a net worth larger than the amount of capital[30,31]	H3	0
DLAWB	C	The closeness to the covenant expressed as (the net worth/the amount of capital − 1) for firms, which have a net worth smaller than the amount of capital	H3	–
S	C	The number of employees in the firm	H5	+
HF	I	The Herfindahl index on a two digit industry level	H6	+
FFA/TA	C	(Tangible fixed+financial assets before revaluation)/total assets before revaluation	H7	+
DOB	C	Debt owed to banks/total debt	H4	?
TECH	I	A dummy, if the R&D expenditures/Sales are high in the industry; otherwise zero[32]		

[28] The variance in performance is determined on a two-digit industry level. First, the variance in CFnext/FA is separately determined for each year and for each industry. Next, the mean score over several years is computed for each industry. This mean score is used for the variance in performance in a certain industry. The variance in performance is high when it is larger than the median of all industries (1244). This situation occurs for sectors 24, 31, 32 and 50.

[29] The equity-to-debt ratio is determined by industry and year. If for an industry the mean score over the five years is smaller than the median of all industries (= 1), the equity-to-debt ratio is low. This situation occurs for sectors 22, 32, 33, 35 and 37.

[30] The legal covenant demands that the net worth is larger than half of the capital. A higher level of capital is chosen for the determination of the dummy to include the firms close to covenant default.

[31] The closeness to the covenant is expressed as a quotient, to eliminate the influence of size.

[32] The industries with high R&D expenditures are 24, 25, 30, 32 and 33.

Table 3
The results from the univariate Van der Waerden test

	Mean score non-revaluers n=179	*Mean score revaluers n=45*	*p-value*
$CF_{NEXT}DV_H$	0.069	−0.316	0.0001
$CF_{NEXT}DV_L$	0.042	−0.196	0.0004
$INCDV_H$	0.072	−0.331	0.0001
$INCDV_L$	0.010	−0.044	0.4552
$DINCDV_H$	0.041	−0.195	0.0001
$DINCDV_L$	0.004	−0.019	0.6623
$CF_{NEXT}DEH$	0.084	−0.383	0.0001
$CF_{NEXT}DEL$	0.032	−0.146	0.0041
DLAWA	0.132	−0.595	0.0001
DLAWB	0.111	−0.503	0.0001
DOB	−0.040	0.183	0.0042
FFA/TA	−0.022	0.100	0.1281
S	−0.058	0.263	0.0001
HF	0.008	−0.039	0.5379

5). Model (1) includes the basic signalling and contracting motives for revaluation.

$$R = \alpha_0 + \alpha_1 CF_{NEXT}DV_H + \alpha_2 CF_{NEXT}DV_L + \alpha_3 DLAWA + \alpha_4 DLAWB + \alpha_5 DOB + \alpha_6 FFA/TA + \alpha_7 S + \alpha_8 HF + \xi$$

As the p-value of Model 1 shows ($p=0.0001$), the variables introduced in the model are significant in explaining the decision to revalue assets. The results indicate that successful firms are not always found to signal their success by not revaluing their assets. In industries with a high variance in performance, it is more rewarding for successful firms to reveal their true type by signalling. The coefficient of $CF_{NEXT}DV_H$ is negative and significant ($p=0.0063$), while the coefficient of $CF_{NEXT}DV_L$ is not ($p=0.2098$). Hence, signalling by successful firms through not-revaluing the assets ($R=0$) is more likely to be found in industries with a high variance in performance, consistent with H1.

The signalling cost, measured by the closeness to the legal covenant (DLAWA, $p=0.0004$ and DLAWB, $p=0.0056$), also has an important influence on the decision to revalue assets. Firms close to covenant default or violation are more likely to revalue assets as their net worth shrinks. This is shown by the significantly negative coefficient of DLAWB ($p=0.0056$) and DLAWA ($p=0.0004$) in Model (1), consistent with H3. Although the coefficient of DLAWB is considerably larger than the coefficient of DLAWA, suggesting that a decrease in the net worth will have a larger impact on the probability of revaluation for firms which violate the covenant, the difference between both coefficients is only significant at 11%.

Finally, the variable size has a positive coefficient significant at the 10% level ($p=0.0936$), weakly consistent with H5 (that large firms are more likely to revalue). The insignificance of the Herfindahl index (H6) might reflect that size is measuring other important factors besides political visibility, such as a knowledge about the opportunities offered by the accounting law. The decision to revalue assets is not influenced by the relative importance of fixed and financial assets (H7), nor by the composition of debts (H4).

The results give some support for the theoretical model. Successful firms are more likely to signal their success through non-revaluation if they are in industries with a high variance in performance. In those industries the cost of not revaluing the assets is too high for the unsuccessful firms to benefit from imitating the successful firm by not revaluing. Overall, the model has a relatively modest R^2 (24.19%) and an apparent error rate of 14.19%.[23]

Signalling future performance and good news cannot only be measured by CF_{NEXT}/FA but also by the change in CF_{next}/FA. In Model 2 the level of cash flows realised in the next year is replaced by the relative change in performance $((CF_{NEXT}/FA)-1)/(CF/FA)$, while in Model 3 a dummy is

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[23] Compared with the naive pure chance model (18.20%), the error rate drops only marginally. A possible reason could be that the group of revaluers in the sample is too small. Large differences exist between the results for each sector. The model gives the best results for the chemical industry (11.64%) and the worst results for the building industry (16.15%). The error rate for the metal industry equals 12.55%. Multicollinearity is not an important problem for the results, as the correlation matrix (see Appendix) demonstrates.

Table 4
The results from the multivariate tests

	Logistic regression				OLS
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Intercept	−1.3589	−1.4306	−1.1480	−1.3902	+0.7342
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0005)
$CF_{NEXT}DV_H$	−0.2229				−0.1792
	(0.0063)				(0.4363)
$CF_{NEXT}DV_L$	−0.0208				+0.2049
	(0.2098)				(0.6403)
$INCDV_H$		−0.0627			
		(0.0835)			
$INCDV_L$		−0.0153			
		(0.5066)			
$DINCDV_H$			−0.8292		
			(0.0002)		
$DINCDV_L$			−0.1959		
			(0.4046)		
$CF_{NEXT}DE_H$				−0.0251	
				(0.2170)	
$CF_{NEXT}DE_L$				−1.2686	
				(0.0111)	
DLAWA	−0.1138	−0.1213	−0.1229	−0.1187	+0.0134
	(0.0004)	(0.0002)	(0.0002)	(0.0003)	(0.6750)
DLAWB	−0.2994	−1.1626	−0.1502	−0.1945	−0.7001
	(0.0056)	(0.0598)	(0.0875)	(0.0413)	(0.0001)
S	+0.0002	+0.0002	+0.0002	+0.0002	−0.0001
	(0.0936)	(0.0995)	(0.1110)	(0.1150)	(0.3039)
DOB	+0.1023	+0.0754	+0.0691	+0.0600	−0.3474
	(0.8297)	(0.8730)	(0.8837)	(0.8992)	(0.5293)
FFA/TA	+0.2311	+0.3577	+0.4301	+0.1740	−1.3228
	(0.6353)	(0.4597)	(0.3737)	(0.7266)	(0.0204)
HF	−0.4751	−0.3766	−0.8922	+0.4736	+1.1936
	(0.6512)	(0.7180)	(0.4333)	(0.6582)	(0.3101)
p-value	0.0001	0.0001	0.0001	0.0001	
−2log intercept	963.754	963.754	963.754	963.754	
−2log intercept and covariates	725.482	728.753	722.639	721.820	
R^2	24.72%	24.38%	25.01%	25.10%	17.13%
n	1038	1038	1038	1038	189
Misclassification rate	14.19%	14.20%	14.19%	14.19%	

introduced, which equals 1 when next year's cash flows are higher and is zero otherwise. These results also confirm the importance of industry characteristics on the signalling function of the revaluation decision. If a firm displays an increase in CF/FA, the positive news is more likely to be revealed in industries with a high variance in performance (in Model 2: $INCDV_H$, $p=0.0835$, $INCDV_L$, $p=0.5066$, in Model 3: $DINC_H$ $p=0.0002$, $DINC_L$ $p=0.4046$). The results for all other independent variables are largely unaffected when using the two additional proxies for success.

Another result from the theoretical model is that a separating equilibrium is more likely to be reached in industries with a low equity-to-debt level. This hypothesis is studied in model 4.[24] As in the basic model, the influence of success on the decision to revalue assets is analysed for industries with a low as compared to a high equity-to-debt level. As the variable $CF_{NEXT}DE_H$ does not have a coefficient significantly different from zero, successful firms are not more likely to reveal their type in industries with a high equity-to-debt ratio ($CFDE_H$, $p=0.2170$). This contrasts with industries where the equity-to-debt ratio is low ($CFDE_L$,

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[24] It was impossible to include both industry characteristics, variance in performance and equity-to-debt ratio, in the same model because $CFDE_L$ is a linear combination of $CFDE_H$, $CF_{NEXT}DV_H$ and $CF_{NEXT}DV_L$.

$p = 0.0111$). In those circumstances, successful firms have a vested interest in not revaluing their assets to reveal their true type, as the significantly negative coefficient of $CF_{NEXT}DE_L$ shows (consistent with H2).

Finally, rather than the decision on whether or not to revalue assets, the actual amount of revaluation (as a % of fixed assets before revaluation) is the dependent variable in Model 5. The OLS results show that, in contrast with the dichotomous decision to revalue assets, where evidence of signalling by successful firms was found at least in some circumstances, no such evidence prevails for the size of the revaluation. As the coefficient of $CF_{NEXT}DV_H$ is not significantly different from zero ($CF_{NEXT}DV_H$, $p = 0.5616$, $CF_{NEXT}DV_L$, $p = 0.7002$), successful firms are not significantly revaluing less; even the variance in performance within their industry is large. These results suggest that, in industries with a high variance in performance, successful firms do engage in signalling, but they use as the signal forbearance of the revaluation option rather than to revalue by a smaller amount. Although this dichotomous choice is a more costly signal for them, it has the advantage that it can be more clearly interpreted by the receivers and hence may prove to be a more effective signal.

There are other notable results. While the decision to revalue assets was not determined by the importance of the fixed and financial assets in the balance sheet, the coefficient of FFA/TA is not significantly different from zero from Models 1 to 4, companies that have a higher share of fixed and financial assets have a smaller incentive to revalue assets, as the significantly negative coefficient of FFA/TA (FFA/TA, $p = 0.0204$) in Model (5) demonstrates. This result is different from what is expected. A possible explanation is that the possibility of revaluing financial assets does not depend on the size of those assets but on the profits realised by subsidiary. To test this conjecture, the ratio of fixed and financial to total assets is replaced by fixed tangible assets to total assets. As this variable has an insignificant coefficient ($p = 0.1110$), it confirms that the financial assets are the source of this unexpected result.

When a firm does not violate the covenant, the amount of the revaluation also decreases as the net worth increases (DLAWB $= -0.7001$, $p = 0.0001$). This result shows that the amount of the revaluation depends on the closeness to the legal covenant once the firm has decided to revalue its assets.

Some additional tests were performed on the data set to test the robustness of the basic results. To zero in on the signalling cost, the legal covenant itself (the net worth—half of the capital) is introduced instead of a higher covenant (the net worth—the amount of capital). Since DLAWB ($p = 0.2722$) becomes insignificant in comparison with Model 1, the results seem to suggest that firms close to, but not yet facing, the legal covenant default are more likely to revalue their assets than firms which violate the covenant (DLAWA, $p = 0.0001$). That the influence on the long term financial position (DLAWA, DLAWB) is more important than the influence on the current year income is also illustrated by the insignificance of the gross margin ($p = 0.1280$), when it is added to the regression analysis. The gross margin has the advantage that it is not influenced by the depreciation amounts on the revalued fixed tangible assets. Together with the significance of the D/E ratio ($p = 0.0273$), when introduced instead of DLAWA and DLAWB, these results illustrate that long term performance and long term financial structure are more relevant than short term financial performance in explaining the revaluation decision.[25]

The basic analysis is extended by distinguishing the revaluation of fixed tangible assets from the revaluation of financial assets. The revaluation of financial assets is less discretionary since it can only be reported when the intrinsic value of the subsidiary's shares is larger than the book value. Firms can exercise more discretion whether or not to report an increase in the book value of the fixed tangible assets as no precise rules are prescribed. Because the revaluation of fixed tangible assets is more discretionary, the revaluers of those assets are expected to differ more from non-revaluers, than would revaluers of financial assets. To test this hypothesis, two regressions were done. One was for the non-revaluers ($N = 849$) versus the revaluers of fixed tangible assets (139) and the second was for the group of non-revaluers (849) versus the revaluers of financial assets (52). The results confirm the hypothesis that the $CF_{NEXT}DV_H$ is a significant variable in explaining the revaluation of fixed tangible assets ($p = 0.0082$) but not for explaining the revaluation of financial assets ($p = 0.3721$).[26]

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[25] A dummy equalling 1 if the number of employees is larger than 50. i.e. companies which by law have to organise employee councils, is introduced. When a firm has to report its results to an employee council, it might have an extra incentive to revalue fixed assets. This dummy has a significant positive coefficient ($p = 0.0002$), while the size variable becomes insignificant. This seems to suggest that size has an influence but not as a continuous variable. A dummy variable DIV, which equals 1 when the firm pays dividends, has a positive significant coefficient ($p = 0.0179$). As profits are usually not distributed in full to shareholders, dividend-paying firms can realise an increase in equity without revaluing assets. Finally, the multiple revaluers over the period 1989–1994 are added to the sample (30). Only the data from the last revaluation year are considered. All the results remain the same as in the basic model, ($CFDV_H$, $p = 0.0073$, $CFDV_L$, $p = 0.2259$, DLAWA, $p = 0.0002$, DLAWB, $p = 0.0105$, $p = 0.0374$), which illustrates the robustness of the results.

[26] The revaluation of financial assets is also not influenced by DLAWA and DLAWB, which illustrates that the performance of the firm is irrelevant in explaining the revaluation of

Bar-Yosef et al. (1995: 60–61) put forward the idea that signalling is more likely to occur in industries with high levels of R&D expenditures because of the greater uncertainty. To test this in the context of revaluation, a dummy, TECH, was added to model 1, which equals 1 for industries with high R&D-to-sales ratios. As the variable TECH has a significantly negative coefficient ($p = 0.0298$), a revaluation of assets is less likely to occur in high-tech industries. This confirms that firms have more incentive to reveal their type in high tech industries, where information asymmetry is much higher.[27] The dummy variable TECH could also capture the bias in FFA/TA because most firms prefer to expense their R&D costs. If this situation occurred, firms in R&D intensive industries would have a greater propensity to revalue, in order to cope with problems of equity depletion. But as firms in R&D intensive industries are less rather than more likely to revalue, a larger decrease in equity seems not to be a reason to revalue more often.

5. Conclusion

Even for firms not quoted on a stock exchange accounting information has an important influence on the beliefs of investors, banks and debt holders. When stakeholders have to decide whether to supply funds to these firms, their non-revaluation of assets can be an important signal of their future success.

This paper analyses the signalling function of not revaluing assets in an environment where the probability of raising investment funds depends on the firm's current financial position as well as the expected success of its projects. As a decision not to revalue assets results in a lower net worth, the probability of violating the minimum legal covenant with respect to the net worth increases. Therefore, non-revaluation of assets results in an increase in expected reorganisation costs. However, the probability of a firm receiving funds can increase when it foregoes a revaluation because it signals it will be more successful. A separating equilibrium, where only the successful firms do not revalue assets, can be reached because the cost of signalling by not revaluing, i.e. the increase in expected reorganisation costs, is smaller and the signalling revenue, i.e. the increase in the expected net cash flows, is larger for successful firms. The results of the theoretical model supplement the existing literature by identifying circumstances in which signalling by not revaluing assets is more likely to occur. A large variance in performance within the industry as well as a low equity-to-debt level were shown to be more favourable conditions for signalling by successful firms.

Testing these hypotheses on Belgian data reveals that the use of revaluation as a signalling device occurs but not in all circumstances. Only in industries with a large variance in performance or sufficiently low equity-to-debt ratios were more successful firms found to have a higher probability of not revaluing their assets. While no significant effect was found for the size of the revaluation, the decision not to revalue assets seems to be an efficient signal for successful firms in these industries. Empirical evidence is also found for the signalling costs to play a significant part in explaining the revaluation decision. When their net worth is lower, firms which are close to covenant violation are more likely to revalue their assets. Evidence was also provided for the non-revaluation of fixed tangible assets to be a more reliable signal. The results indicate that the revaluation of financial assets does not give information about future cash flows.

The results reported here should not be interpreted as suggesting more than that signalling motives enter into the revaluation decision. Without any direct assessment of motives for revaluation, the use of future cash flows to test the signalling hypotheses calls for a cautious stance when interpreting the results. Other reasons why firms with higher future cash flows are less likely to revalue cannot be excluded. The main contribution of the paper is in theoretically identifying the industry circumstances in which signalling by successful firms may be more powerful. The different results for the dichotomous versus the continuous revaluation choice suggest that, when firms want to eliminate asymmetric information, they consider the efficiency of signalling devices, trading off the net (opportunity) cost of using the signal against the impact on investors' beliefs.

Appendix

Proposition 1: The revaluation of assets results in a decrease in the expected reorganisation costs, cp.

Proof: $TER_t\ (\breve{s}_H,\ R = R1) - TER_t\ (\breve{s}_L,\ R = M) > 0$ (A.1)

From using expression (3) for TER, it can easily be established that LHS of (A.1) is equal to $((1 - p^{nf})\exp\text{-}bs_t + p^{nf})^* \exp\text{-}bE/D^*(\exp\text{-}bR/D\text{-}\exp\text{-}bM/D)$. The first two terms are positive. Also, the last term is negative when $R < M$. QED. Note that the proposition already follows from the fact that $\partial TER/\partial R < 0$.

As the amount of revaluation R1 decreases, the effect on the deterioration of the financial struc-

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financial assets. The importance of fixed and financial assets ($p = 0.0221$) and the size of the firm ($p = 0.0154$) have a significant influence on the revaluation of the financial assets.

[27] Including the interaction with successfulness fails to establish a significant effect, indicating that all firms, not just the more successful firms, have a higher incentive to not revalue in these industries.

ture is larger. As the difference between the cash flows increases, the difference between the expected reorganisation costs increases, the successful firm gains more from identification as a successful firm and the amount of R1 must be smaller to reach an increase in the expected reorganisation costs.

Proposition 2: The increase in the expected reorganisation costs by choosing a smaller amount of revaluation is larger for s_L

The increase in the expected reorganisation costs by choosing a smaller amount of revaluation $R1 < M$ is larger for the unsuccessful firm when: $TER_L(s_H, R=R1) - TER_L(s_L, M) > TER_H(s_H, R=R1) - TER_H(s_L, M)$ (A.2a)

Proof: Again using the expression (3) for TER, it can easily be established after some rearranging that (A.2) corresponds to

$$\frac{(1-p^{nf}(\breve{s}_H))}{(1-p^{nf}(\breve{s}_L))} > e^{-b(M-R1)/D} \qquad \text{(A.2b)}$$

As $p^{nf}(\breve{s}_H)$ is smaller than $p^{nf}(\breve{s}_L)$, the LHS of (A.2b) is certainly larger than 1. The RHS is certainly smaller than 1 because $M > R1$ and e^{-bx} is smaller than 1 for all values of x. *QED.*

Proposition 3: The following configuration is a signalling equilibrium (sequential equilibrium): A firm of type $t=H$ chooses $R1 < M$, while a firm of type $t=L$ chooses M. The investors believe $\breve{s}=s_H$ if they observe $R=R1$. If they observe $R=M$, $\breve{s}=s_L$.

Proof: That the investor's beliefs are rational given the strategies of firms of both types is easy to see. What remains to be established is whether proposition 3 describes an optimal strategy for firms of both types given investor's beliefs, i.e. whether firms have no incentive to unilaterally deviate.

A firm of type $t=H$ does not want to deviate from $R<M$ when

$$(1-p^{nf}(\breve{s}_H))^* s_H - TER_H(\breve{s}_H, R)$$
$$\geq (1-p^{nf}(\breve{s}_L))^* s_H - TER_H(\breve{s}_L, M)$$

or

$$(p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* S_H \geq TER_H(\breve{s}_H, R^*) - TER_H(\breve{s}_L, M) \qquad \text{(A.3a)}$$

A firm of type $t=L$ does not want to deviate from $R=M$ when

$$(1-p^{nf}(\breve{s}_L))^* s_L - TER_L(\breve{s}_L, M) \geq (1- p^{nf}(\breve{s}_H))^* s_L - TER_L(\breve{s}_H, R)$$

or

$$(p^{nf}(\breve{s}_H) - p^{nf}(\breve{s}_L))^* s_L \geq TER_L(\breve{s}_L, M) - TER_L(\breve{s}_H, R). \qquad \text{(A.3b)}$$

Given that R increases expected cash flows, all else equal (see proposition 1), the H-type will select the highest level of revaluation that still satisfies (A.3b): the H-type wants to select an amount of revaluation as high as possible under the condition that the low firm will not mimic its strategy. This amount of revaluation, R^*, can be obtained from (A.3b) that holds with equality. After some rearranging, this yields

$$R^* = D/b^*(1nTER_L(\breve{s}_H, R=0) - 1n((p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_L + TER_L(\breve{s}_L, R=M)) \qquad \text{(A.3c)}$$

It still needs to be established that this R^* satisfies (A.3a). From proposition 2 we know that the RHS of (A.3c) is larger than $(TER_H(\breve{s}_H, R^*) - TER_H(\breve{s}_L, M))$. Hence $(p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_L$ is also larger than $TER_H(\breve{s}_H, R^*) - TER_H(\breve{s}_L, M)$. With $s_H > s_L$, $-(p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_H$ is a fortiori larger than $TER_H(\breve{s}_H, R^*) - TER_H(\breve{s}_L, M)$, which corresponds precisely with (A.3a) *QED.*

Condition A3b also shows that R^* is smaller than M. The LHS is negative because $(p^{nf}(\breve{s}_H) < p^{nf}(\breve{s}_L))$. Therefore, the RHS must also be smaller than zero. Because the expected reorganisation costs are larger when the investors believe that it is an unsuccessful firm, R^* must be smaller than M to reach a situation, where $TER_H(\breve{s}_L, M) < TER_H(\breve{s}_H, R^*)$.

It is important to note that there are multiple separating equilibria. In fact all values of $R < R^*$ chosen by the H-type would satisfy *a fortiori* (A.3b). Take for instance the case of a dichotomous choice of $R=0$ by the H-type, while the L-type prefers $R=M$. Given that the L-type will not mimic a choice of $R=0$, not revaluing could be a better strategy for the H-type than to revalue $R=M$.

> In order to have condition (A.3a) satisfied with $R=0$, note that LHS of (A.3a) is increasing in s_H: $\partial LHS/\partial s_H = (p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H)) - s_H {}_* \partial p^{nf}(\breve{s}_H)/\partial s_H > 0$ with $= (p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H)) > 0$ and $\partial p^{nf}(\breve{s}_H))/\partial s_H < 0$. The RHS of (A.3a) is decreasing in s_H: while $\partial TER/\partial s < 0, |\partial TER_H(\breve{s}_L, M)/\partial s_H| < |\partial TER_H(\breve{s}_H, 0)/\partial s_H|$. Define s_H^+ to be the level of s_H for which (A.3a) holds with equality. Then with $s_H > s_H^+$ condition (A.3a) will hold.

Hence with s_H large enough, a signalling outcome with the H-type not revaluing, while the L-type revalues the maximum amount M, and the investor's belief structure as in proposition 3, is a sequential equilibrium.

Proposition 4: If the variance in performance in the industry is larger, a separating equilibrium, where *the successful firm does not revalue assets, is more easily reached, while R* decreases.*

Proof: Define $s_H = s_L + \Delta$

The effect on the signalling revenue of a larger difference between s_H and s_L is positive:

$$(p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* \quad s_t = \exp - a(E/D+s_L)(1 - \exp(-a\Delta))s_t \qquad \text{(A.4a)}$$

Hence:

$$\partial(\text{A.4a})/\partial\Delta = a^*(\exp(-a\Delta))^*\exp\text{-}a(E/D+s_L) \qquad \text{(A.4b)}$$

which is positive.

The effect on the increase in TER of a larger difference between s_H and s_L is negative:

$$TER_H(\breve{s}_H,R^*) - TER_H(\breve{s}_L,M) = C^*\exp\text{-}b((E+R)/D+s_t)^*(1\text{-}\exp\text{-}bP/D+\exp\text{-}a(E/D+s_L)^*(\exp(\text{-}a\Delta)\text{-}\exp\text{-}bP/D))$$
$$\text{where } M = R+P \qquad \text{(A.4c)}$$

Hence:

$$\partial(\text{A.4c})/\partial\Delta = -a^*C^*\exp\text{-}b((E+R)/D+s_t)^*(\exp\text{-}a(E/D+s_L)^*(\exp(-a\Delta) \qquad \text{(A.4d)}$$

which is negative.

Since signalling revenue increases while the signalling cost decreases when the difference between s_H and s_L is higher, signalling by revaluing less becomes more attractive. Note that this holds for both types. Since it also holds for the unsuccessful type, clearly in order to have a separating equilibrium where the low type is not mimicking the signalling strategy of the successful type, the latter must choose a lower level of revaluation to prevent imitation. Indeed it is straightforward to show that R* is decreasing in Δ:

From (A.3c) it can be shown that $\partial R^*/\partial\Delta < 0$ given that $\partial \ln TER_L(\breve{s}_H, R=0)\partial\Delta < 0$ while $\partial \ln((p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_L)/\partial\Delta > 0$ and $\partial TER_L(\breve{s}_L, R=M))\partial\Delta = 0$. QED.

From the expressions (A.4b) and (A.4d) it is easy to see that $\partial(\text{A.4b})/\partial s_t > 0$ and $\partial(\text{A.4d})/\partial s_t > 0$. Hence the increase in signalling revenue from a higher variance is larger for the more successful firm. At the same time, the decrease in signalling cost is higher for the more successful firm. Both effects combined indicate that signalling becomes relatively more attractive for the successful firm than for the unsuccessful firm in industries with a higher variance in success.

Proposition 5: If the equity-to-debt ratio in the industry is higher, a separating equilibrium, where the successful firm does not revalue assets, is less easily reached, while the effect on R is undetermined.*

In a similar spirit the effect of the E/D ratio on the likelihood of establishing a separating equilibrium can be established.

Proof: The effect on the signalling revenue of a larger E/D ratio is negative:

$$\partial(\text{A.4a})/\partial E/D = -a^*(p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_t \qquad \text{(A.5a)}$$

The effect on the increase in TER of a larger E/D ratio is also negative:

$$\partial(\text{A.4c})/\partial E/D = -b^*(\text{A.4c}) - a^*(C^*\exp\text{-}b((E+R)/D+s_t)^*\exp\text{-}a(E/D+s_L)^*\exp(-a\Delta) - \exp - bP/D)) \qquad \text{(A.5b)}$$

A larger E/D ratio decreases the benefits from signalling. At the same time, it decreases the costs of signalling for both types. Consequently, the total effect on the net profitability of signalling is unclear.

Given this, it is easy to see that the effect on R* will also be undetermined.

From (A.3c) it can be shown that $\partial R^*/\partial E/D >< 0$ given that $\partial \ln TER_L(\breve{s}_H, R=0)/\partial E/D < 0$ while $\partial \ln((p^{nf}(\breve{s}_L) - p^{nf}(\breve{s}_H))^* s_L)/\partial E/D < 0$ and $\partial TER_L(\breve{s}_L, R=M))/\partial E/D < 0$.

Again, from the expression for (A.5a) and (A.5b), it is easy to see that $\partial(\text{A.5a})/\partial s_t < 0$ and $\partial(\text{A.5b})/\partial s_t > 0$. Hence, the decrease in signalling benefits is larger, while the decrease in signalling cost is smaller for the successful firm as compared to the unsuccessful firm. Consequently, a separating equilibrium with the successful firm signalling becomes less likely. QED.

Pearson correlation coefficients

	CFDVH	*CFDVL*	*DLAWA*	*DLAWB*	*FFA/TA*	*DOB*	*HF*	*S*
CFDVH	1.000	−0.002	−0.006	−0.005	−0.071	−0.042	−0.014	−0.013
CFDVL	−0.002	1.000	−0.001	−0.082	−0.045	−0.027	0.050	−0.007
DLAWA	−0.007	−0.008	1.000	0.037	0.060	0.054	0.051	0.315
DLAWB	−0.005	−0.082	0.037	1.000	0.049	−0.038	0.027	0.024
FFA-TA	−0.071	−0.045	0.060	0.049	1.000	0.527	0.201	0.097
DOB	−0.042	−0.027	0.054	−0.038	0.527	1.000	0.151	0.129
HF	−0.014	0.050	0.051	0.027	0.201	0.151	1.000	0.144
S	−0.014	−0.008	0.315	0.024	0.097	0.129	0.144	1.000

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Board composition, ownership structure and hostile takeovers: some UK evidence

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Abstract—This paper examines the relationship between internal and external control mechanisms in a sample of hostile takeover targets and a control group of non-target firms in the UK for the period 1989–93. The paper investigates whether there are significant differences in board composition, executive ownership and external shareholder control between the two groups. We find that hostile targets are more likely to have different individuals in the roles of chairman and CEO but employ non-executives with fewer additional directorships than non-targets. Executive share ownership is significantly lower in targets, suggesting that hostile bids are more likely to be pursued when target managers possess insufficient equity either to defeat the bid or make the bid too expensive for bidders. We find some evidence that institutional and unaffiliated blockholders in smaller targets help managers defeat unwanted bids.

1. Introduction

The 1990s has witnessed an increased interest in the quality of governance and accountability in UK companies. Public companies are categorised by having ownership dispersed among a large number of shareholders, while management is vested in the hands of a small number of professionals who are unlikely to share shareholder interests. An important objective of recent governance deliberations is to ensure that appropriate mechanisms of internal governance exist to prevent executives pursuing their own interests at the expense of other stakeholders. For example, the *Report of the Committee on the Financial Aspects of Corporate Governance* (Cadbury, 1992) places particular emphasis on the monitoring role of the board of directors and institutional shareholders—recommending greater use of non-executive directors, suggesting that companies should avoid having the same individual occupying the roles of company chairman and CEO, and encouraging institutional shareholders to take a more active role in ensuring governance quality in the companies in which they invest.

In addition to improving governance through board composition and external shareholder participation, managerial ownership may also reconcile the interests of shareholders and managers since owner-managers are less likely to pursue non-value-maximising behaviour (Jensen and Meckling, 1976). Externally, the market for corporate control is often advocated as an important mechanism for protecting shareholder welfare.

The launch of a hostile takeover bid is generally perceived as a signal by the bidder that the target's assets are not being maximised for the benefit of shareholders. A hostile bid gives target shareholders the opportunity to replace underperforming or opportunistic managers. Indeed, Jensen (1986) suggests that 'the external takeover market serves as a court of last resort...that plays an important role in protecting shareholders when the corporation's internal controls....are slow, clumsy, or defunct'.

Viewing takeover governance in this way highlights the potential relationship between internal and external mechanisms of governance. On the one hand, internal governance mechanisms and hostile takeovers may be seen as substitutes, and therefore we may expect hostile takeover targets to exhibit inferior governance characteristics (i.e. lower non-executive representation, CEO chairman duality) compared to non-targets. Alternatively, it may be argued that since the costs of governance through hostile takeover is greater than changes in internal governance (e.g. the recruitment of additional non-executive directors), takeovers are more likely to occur in companies where strong governance mechanisms exist but nevertheless have proved ineffective in reconciling shareholder and manager objectives.

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The objective of this paper is to compare the internal governance characteristics of a sample of UK hostile targets with a control group of non-targets to ascertain whether takeovers seek to correct for weak internal governance, or alternatively represent a governance mechanism of last resort undertaken when appropriate internal governance mechanisms exist but are ineffective. The paper investigates whether there are significant differences in board composition and leadership, managerial ownership, and the existence of large shareholders between the two groups.

Differences between the UK and US systems of governance suggest that the UK may be a useful environment in which to analyse the relationship between internal and external control. Prior to Cadbury (1992), UK boards were categorised by a majority of executive directors while US studies consistently report a greater use of non-executive directors. Furthermore, as noted by Black and Coffee (1994), institutional investors in the UK own a significantly greater proportion of equity compared to their US counterparts. However, despite greater levels of institutional ownership, public shareholder activism in the UK is rare—indeed Black and Coffee (1994) find only a few instances of external shareholders publicly seeking to implement leadership change in UK companies. In addition to board composition and shareholder characteristics, the regulation of takeover activity also operates differently in the UK. The *City Code on Takeovers and Mergers*, which regulates UK takeovers, prohibits defensive tactics during the period of a bid, as well as prohibiting preclusive pre-bid actions such as adopting a poison pill. Consequently, UK shareholders are able to decide on the success or failure of a bid free from the numerous methods of entrenchment commonly utilised by target managers in the US.

Interestingly, Black and Coffee (1994) note that even though managers in the UK appear to have less freedom in defending unwanted bids, the proportion of UK hostile bids successfully defended by managers (often with institutional shareholder support) is greater than was the case in the US prior to the introduction of poison pills.

The paper is structured as follows: Section two explores the possible relationship between board composition, ownership and the likelihood of a hostile takeover. Section three describes the data and variables used in the study. The empirical results are presented and discussed in Section four. Some conclusions and suggestions for further research are made in Section five.

2. Hostile takeovers and internal governance

The governance role of takeovers is rooted in Manne's (1965) doctrine that the stock market provides an objective measure of managerial performance. When an opportunity to create new value via the redeployment of assets or the displacement of existing managers becomes apparent, the firm becomes an attractive target in the market for corporate control. Thus, the greater is management's departure from value-maximisation, the greater the potential gain for an acquirer and consequently the more vulnerable the incumbent management team is to a takeover bid.

A great deal of theory and evidence supports the idea that takeovers address governance problems. Schleifer and Vishny (1997) identify two consistent themes which have emerged from takeover research: takeovers typically increase target value indicating shareholders' belief that profits are expected to increase after the takeover, and takeover targets are likely to be poorly performing companies. Kennedy and Limmack (1996) analyse the disciplinary role of takeovers by examining CEO turnover after 233 takeover attempts in the UK in the period 1980–89. The authors report a significant increase in CEO turnover after a takeover—67% of all targets experience a change in CEO within two years of being acquired. Furthermore, Kennedy and Limmack (1996) found that CEO change is more likely to occur in targets that experience below average share price performance in the five year period prior to the takeover bid. In a similar study in the US, Walsh and Ellwood (1991) found that 39% of target CEOs depart within two years of a takeover. The corresponding rate of turnover in a control sample of non-targets was 15%. Even though the authors of both of these studies acknowledge that all the recorded CEO changes are unlikely to be disciplinary, these findings provide some support for takeover governance.

Mikkelson and Partch (1997) provide an interesting insight into the disciplinary role of takeovers in the US by comparing levels of managerial turnover during a period of an active takeover market (1984–88) and a period of less active takeover activity (1989–1993). Mikkelson and Partch (1997) find that takeover activity and the sensitivity of top management turnover to performance is greater during the active takeover period. While the authors are unable to conclude that a decline in takeover activity actually causes a reduction in management turnover, the results are suggestive of periods of active takeover putting greater pressure on managers to optimise performance in order to avoid displacement. The remainder of this section explores the relationship between the likelihood of a hostile takeover and the principal mechanisms of internal governance available to shareholders.

2.1. Board composition and leadership

The principal duty of the board of directors in a publicly held company is to protect and promote the interests of shareholders. The board is authorised to endorse managerial initiatives, evaluate the performance of senior executives, and to reward or penalise their performance. In order to strengthen the governance function of the board it is often recommended that membership should comprise both executive and non-executive directors. While executive directors may contribute to board effectiveness with their skill, expertise and industry-specific knowledge of the business, non-executives have the advantage of bringing independence and impartiality to the evaluation of management actions (Baysinger and Hoskisson, 1990; Cadbury, 1992). In addition to non-executive representation, board leadership has also attracted governance attention. In the UK for example, Cadbury (1992) recommends that 'there should be a clearly accepted division of responsibilities at the head of a company....such that no one individual has unfettered powers of decision' (para. 4.9). The preference for the separate board leadership structure is grounded in agency theory concerns regarding the potential for CEO/chairman duality reducing the monitoring effectiveness of the board. However, even though recent evidence suggests that CEO/chairman duality is a declining feature of UK boards (Cadbury, 1995), as Dalton et al (1998) note, it remains an important feature of the US corporate environment.

Even though there appears general agreement on the potential monitoring value of non-executive directors and separating the roles of CEO and chairman, the available empirical evidence is mixed. For example, Baysinger and Butler (1985) report a lagged relationship between the proportion of non-executive directors and corporate performance. Weisbach (1988) finds that boards possessing a higher proportion of non-executives are more likely to replace the firm's CEO after a period of poor performance, while Rosenstein and Wyatt (1990) document significant positive excess returns on days surrounding the appointment of outside directors, suggesting that such appointments are associated with increases in shareholder wealth. However, as pointed out by John and Senbet (1998), studies utilising performance measures other than the impact on shareholder wealth have failed to provide support for the value of non-executive monitoring. For example, Fosberg (1989) fails to find any significant relationship between the proportion of outside directors and a variety of performance measures.

Similarly, Hermalin and Weisbach (1991), using Tobin's Q as a performance measure, find no relationship between board composition and performance. In respect of CEO/chairman duality, Rechner and Dalton (1991), using return on equity, found that firms with different individuals in the positions of CEO and chairman outperformed firms with CEO/chairman duality. On the other hand, Donaldson and Davis (1991) found that firms with CEO/chairman duality achieved higher shareholder returns compared to firms separating the two positions.

A number of US studies have examined board composition in the context of takeovers. Morck et al (1989) analysed performance and management changes in a sample of 454 takeovers and management buy-outs in the 1980s. Boards of directors in healthy industries were found to play an important role in dismissing top management in firms whose performance was weak relative to their stronger performing counterparts. On the other hand, the correction of managerial failure was undertaken predominantly by takeovers in poorly performing industries. Morck et al (1989) suggest their results are consistent with the notion that the corporate board and takeovers are alternative mechanisms of corporate control. Similar conclusions are made by Shivdasani (1993) in a study of the governance characteristics of a sample of 214 hostile targets versus a control sample of non-targets. The likelihood of a hostile takeover was found to be negatively related to the number of additional directorships (Shivdasani's proxy for non-executive quality) possessed by non-executive directors.

In a study of the US savings and loans industry, Brickley and James (1987) found that the presence of non-executive directors serves to reduce managerial consumption of perquisites in the absence of an effective takeover market. In a study of board composition in the US insurance industry, Mayers et al (1997) found that mutual insurers compensate for the absence of an active takeover market by utilising a greater proportion of outside directors compared to their proprietary counterparts. Furthermore, Mayers et al (1997) found that mutuals that convert to stock companies reduce the proportion of outside directors while stock insurers that mutualise increase the proportion of outsiders on the board. This evidence supports the hypothesis that outside director monitoring is perceived as an important substitute for the absence of managerial discipline expected to be associated with an active takeover market. Finally, Arthur and Taylor (1995) report a higher proportion of non-executive directors on boards in states that possess restrictive takeover legislation compared with their more permissive counterparts.

Even though the impact of board leadership on takeover activity has received little academic attention, Shivdasani (1993) does include such a variable in his logit model of takeover likelihood. Shivdasani (1993) finds that CEO/chairman duality has a negative (marginally significant) impact on the likelihood of a hostile bid. If CEO/chairman duality is associated with inferior governance, Shivdasani's results suggest that, in terms of board leadership at least, some aspects of internal governance may not be corrected by hostile takeovers. Indeed, Shivdasani (1993) also finds a significant negative relationship between the proportion of equity owned by CEOs and the likelihood of a hostile takeover. Taken together, these results suggest that CEOs who also serve as chairmen may become entrenched and consequently potential bidders are reluctant to make a bid (of course significant equity ownership would help to defeat an unwanted bid in any case).

2.2. Executive share ownership

Jensen and Meckling (1976) argue that agency conflicts between managers and shareholders may be reconciled when managers possess an ownership interest in their company. According to Jensen and Meckling (1976), managers and directors are inside shareholders who participate in the decision-making process as well as enjoying the benefits of ownership. Outside shareholders play a passive role in the firm's decision-making process. In Jensen and Meckling's (1976) convergence-of-interest model, an increase in the proportion of the firm's equity owned by insiders is expected to result in an increase in firm value as the interests of inside and outside shareholders are realigned. In the context of takeovers, Baron (1983) hypothesises that target managers' preference for retaining control during a takeover is influenced by their level of share ownership in the firm.

When personal financial gain (as a consequence of substantial equity holdings) arising from a change in ownership are non-trivial, incumbent managers are less likely to oppose a takeover attempt. On the other hand, Stulz (1988) develops a non-linear model which demonstrates how high managerial ownership can actually reduce the likelihood of a successful takeover. A high concentration of managerial ownership may prevent the efficient operation of the market for corporate control by allowing entrenched managers to block unwanted takeovers, or by raising premiums to such a prohibitive level that takeovers become unprofitable transactions for bidding firms.

Empirical studies on the impact of managerial ownership on takeover likelihood have produced mixed results. Morck et al (1988), in a study of Fortune 500 companies, find a positive relationship betweeen managerial ownership and the likelihood of a friendly acquisition but find no significant relationship in the case of hostile acquisitions. Mikkelson and Partch (1989) examine a random sample of 240 industrial firms and find that managerial ownership is negatively related to takeover activity. Ambrose and Megginson (1992) find that insider ownership is not related to takeover likelihood. However, Song and Walkling (1993) find that takeover targets are associated with significantly lower levels of managerial ownership than a matched sample of non-targets. Finally, in a study of hostile takeovers, Shivdasani (1993) finds that managerial ownership is significantly lower in the case of targets compared to a control group of non-targets.

In addition to bid likelihood, a number of studies have examined the impact of managerial ownership once a bid has been launched. Of particular interest in this respect is whether ownership influences target management's attitude to the bid and/or the eventual outcome of the bid. Studies in the US by Song and Walkling (1993) and Cotter and Zenner (1994) and in the UK by Holl and Kyriazis (1996) find that bids are more likely to be friendly when management hold significant equity holdings. All three studies also find that bid success is positively related to managerial ownership. These studies are useful in attempting to understand the potential impact of managerial ownership on hostile takeovers, since significant levels of managerial ownership are expected to make a successful bid less likely and, consequently, less likely to be launched.

2.3. Large external blockholders

The corporate governance role of large external shareholders has attracted academic attention for two reasons. The first is associated with the possibility of large shareholders having significant voting power and improved incentives to supervise the activities of managers (Demsetz, 1983). Unlike dispersed shareholders, it is argued that the potential benefits to large shareholders from ensuring that managers do not engage in non-value-maximising behaviour are likely to exceed the costs of doing so. Thus, it is expected that firm performance is improved when large external shareholders undertake a more active interest in important corporate issues and play a vigilant role in monitoring managers. The available empirical evidence appears to be consistent with this view. Hill and Snell (1988) found that the presence of large blockholders has a positive impact on profitability and corporate strategy in the US. In the UK, Leech and Leahy (1991) report a positive association between large shareholder control and corporate performance. In the context of takeovers, Brickley et al (1988) and Agrawal and Mandelker (1990) find that firms with large external shareholders are less likely to adopt value-reducing anti-takeover amendments than firms with more dispersed ownership. In a recent study in the Netherlands, Kabir et al (1997) also find that firms with dispersed ownership are more likely to utilise anti-takeover defensive measures. It appears therefore that the presence of large shareholders facilitates more active monitoring of managerial performance and serves to reduce the need for takeover discipline.

The second academic interest focuses on the ability of large shareholders to resolve the free-riding problem inherent in takeover transactions (Grossman and Hart, 1980). According to the theoretical model developed by Schleifer and Vishny (1986), large external shareholders may facilitate takeovers by selling their shares to bidding firms when incumbent managers are underperforming and unwilling to implement reforms. The empirical evidence on the impact of large shareholdings on takeover likelihood is unclear. Shivdasani (1993) finds that unaffiliated blockholders in hostile targets have significantly larger ownership stakes than their counterparts in non-target firms. However, Pound (1988) finds that the likelihood of dissidents gaining victory in proxy contests is reduced when the ownership level of external shareholders is high. In a recent UK study, Sudarsanam (1995) finds that institutional ownership is an important factor in ensuring bidder success in hostile takeovers.

3. Sample and variable description

The sample comprises 116 firms, consisting of 58 hostile targets and 58 non-targets. *Acquisitions Monthly* and *FT Mergers and Acquisitions International* were used to identify UK listed firms involved in hostile takeovers between 1989 and 1993 inclusive. We have restricted our study to takeovers prior to the implementation of the recommendations of the *Committee on the Financial Aspects of Corporate Governance* (Cadbury, 1992). In December 1992, the committee recommended that all quoted companies should have a minimum of three non-executive directors and should also separate the roles of company chairman and CEO. The Committee's recommendations have subsequently been incorporated as best practice by the London International Stock Exchange (LISE) and listed companies are now required to report annually on their compliance with the committee's proposals. As a consequence, there has been a significant increase in both the proportion of non-executive directors on UK boards as well as an increase in the number of firms separating the roles of CEO and chairman (Cadbury, 1995). These changes are likely to reduce the varation in the board composition and leadership variables and consequently reduce the power of our empirical tests.

Since governance characteristics may differ depending on firm size (Demsetz and Lehn, 1985) and type of industry (Shivdasani, 1993), the control sample is constructed by matching each target with a corresponding non-target firm on the basis of industrial classification and sales turnover, at the time of the bid announcement. Control firms were matched with a target on the basis of having the same primary SIC code and also belonging to the same Stock Exchange industrial classification. Information on three-digit SIC codes and the industrial classification of firms was obtained from the *FAME Database* and *Stock Exchange Official Yearbooks* respectively. Furthermore, control firms were matched for size on the basis of turnover in the financial year immediately prior to the takeover bid. In order to be selected each control firm's turnover was required to be within 10% of the turnover for its corresponding target. To verify that none of the firms in the control sample had received a takeover bid, both the *Financial Times* and *The Times* indices were monitored for a period of three years before and three years after the announcement of a bid for their target counterparts.

Table 1 reports summary statistics for a selection of firm characteristics and performance measures. In respect of firm size, the mean market capitalisation is £349m for the sample of hostile targets and £330m for the non-targets. Average turnover for the sample of target firms is £448m and £449m for the non-targets. Since the two samples are matched for size, the mean and median comparisons reveal no significant difference between the two samples. Table 1 also presents three measures of performance for the samples: market-to-book ratio, abnormal returns and return on capital employed. The market-to-book ratio examines the relationship between a firm's market capitalisation and the book value of total net assets as reported in the firm's balance sheet. The mean and median comparisons reveal no significant differences between the samples. Abnormal returns are obtained from the *London Business School Share Price Database* (LSPD) and represent the average annual abnormal return for years two–four prior to the year the takeover was launched. Returns for the year immediately prior to the takeover bid were excluded in order to reduce the possibility of including an element of any bid premium.[1] The average abnormal returns are slightly higher in the case of non-targets, but neither the mean nor median are significantly different between the two samples.[2] Return on capital employed is obtained from *Datastream* and is defined as net profit before taxation/total net assets. Return on capital employed shows significant differences between the two groups with the sample of targets exhibiting significantly lower returns compared to the non-targets. If hostile takeovers

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[1] The abnormal returns for the financial year immediately prior to the takeover bid shows higher returns for target firms (t-statistic = 1.48).

[2] Targets show marginally higher returns in year −2 (t-statistic = 0.51) but lower returns in years −3 (t-statistic = 1.23) and year −4 (t-statistic = 0.50).

Table 1
Selected firm characteristics and performance variables for a sample of hostile takeover targets and a control sample of industry- and size-matched non-target firms for the financial year preceding the takeover bid

	Hostile takeover targets (n=58)				*Control group of non-targets (n=58)*					
Characteristics	*mean*	*median*	*min*	*max*	*mean*	*median*	*min*	*max*	*Means difference t-statistic*	*Median difference Wilcoxon Z*
Market capitalisation (£ m)	349	107	7.15	3,144	330	62	6.29	4,061	0.15 (0.880)	1.05 (0.292)
Turnover (£ m)	448	135	2.93	5,144	449	134	1.03	4,792	−0.01 (0.994)	0.14 (0.890)
Market to book ratio[a]	1.64	1.42	−1.64	5.75	1.81	1.48	−2.39	4.46	−0.72 (0.476)	−0.83 (0.405)
Abnormal returns[b]	1.71	−0.33	−35.67	47.0	2.92	3.83	−35.67	43.0	−0.34 (0.737)	−0.71 (0.476)
Return on capital employed (%)[c]	12.91	12.33	−27.44	39.62	19.01	19.35	−16.40	83.74	−2.57 (0.011)	−2.73 (0.006)
Capital gearing (%)[d]	57.61	53.94	0.19	149.87	65.52	49.56	4.54	287.11	−0.85 (0.395)	0.14 (0.886)
Liquidity (%)[e]	0.90	0.87	0.11	2.55	0.84	0.80	0.13	1.84	0.73 (0.469)	0.46 (0.644)

p-values are in parentheses.

[a] Market to book ratio is the ratio of the market value of equity to the book value of equity. Both figures are measured at the financial year end date immediately prior to the takeover bid.

[b] Abnormal returns are obtained from the *London Business School Share Price Database (LSPD)* and represent the average annual abnormal return for years 2-4 prior to the takeover year.

[c] Return on capital employed is obtained from *Datastream* and defined as: profit before taxation/total net assets (%).

[d] Capital gearing is obtained from *Datastream* and defined as: long term liabilities + bank overdrafts/share capital + reserves (%).

[e] Liquidity is obtained from *Datastream* and defined as: current assets − stock/current liabilities (%).

are motivated by the potential for future gains from the correction of managerial failure, lower returns are expected for takeover targets.

Finally, since previous research shows that firms which are lowly geared or highly liquid are attractive takeover targets (Palepu, 1986; Barnes, 1990) we also obtain measures of capital gearing (long term liabilities+bank overdrafts/share capital+reserves) and liquidity (current assets – stock/current liabilities) from *Datastream*. However, our mean and median comparisons in Table 1 show no significant differences between targets and non-targets in respect of gearing or liquidity.

Based on the internal governance literature reviewed in the previous section, board composition, managerial ownership, and the ownership of external blockholders are used to proxy for internal governance characteristics. The percentage of non-executive directors is used to represent the extent of board monitoring.[3] Various US studies have usefully categorised non-executive directors in relation to their business affiliation with the firms on whose boards they serve. Until recently, UK disclosure requirements did not oblige companies to reveal such information so we are unable to include a precise measure of non-executive affiliation in this study.[4] However, in an attempt to obtain further insights into non-executive independence, two further variables are included to proxy for non-executive independence.

First, we categorise non-executive directors depending on the length of time spent on a company's board.[5] Corporate governance discussions in both the US and the UK have highlighted the potential for non-executive directors who serve for long periods to be more closely aligned with management compared to directors with shorter tenure. Consequently, the recent report of the *Committee on Corporate Governance* (Hampel, 1998) suggests that non-executive directors should put themselves forward for re-election every three years. Furthermore, in the US, Michigan state law excludes from the definition of independent any directors who have served on a firm's board for an aggregate period of three years or more. Consequently, we analysed the annual reports of companies in our sample for up to five years prior to the year immediately before the takeover bid and categorised any non-executives serving for the whole of this period as being affiliated.

Second, we include a variable representing the average number of additional directorships held by each non-executive director. Only directorships held in other UK listed companies (i.e. companies quoted on the full market or on the Unlisted Securities Market but excluding directorships in investment trusts) were included in calculating this variable.[6] In a corresponding study in the US, Shivdasani (1993) utilises a similar variable to proxy for non-executive quality, arguing that non-executive independence is likely to be reflected in the number of additional directorships each non-executive possesses. The number of directorships held by individual directors has also been utilised by Gilson (1990) in seeking to evaluate the market's subsequent perception of directors of firms involved in financial restructuring.

We use a binary variable to denote instances where the same individual occupies the positions of chairman and CEO, since recent governance discussions suggest that such a duality of roles may not be in shareholders' interests (Cadbury, 1992; Jensen, 1993). In light of Shivdasani's (1993) finding that CEO/chairman duality may have a negative impact on the likelihood of a hostile takeover, we include a binary variable to indicate the presence of the company founder as CEO/chairman so as to investigate whether CEO/chairman entrenchment is more likely to occur in the presence of the firm's founder.[7]

We utilise separate variables to represent the proportion of equity owned by the CEO, the ownership of executive directors other than the CEO and the ownership of non-executive directors. UK legislation requires all public companies to disclose the identity and ownership level of all shareholders owning in excess of 5% of total equity.[8] The executive and non-executive share ownership variables measure beneficial and voting shares only. We utilise a number of variables to measure the proportion of equity owned by external blockholders: the proportion of total equity owned by institutional and non-institutional shareholders as well as the ownership of affiliated and unaffiliated external shareholders. Studies by Sudarsanam (1995) in the UK and Duggal and Millar (1994) in the US have suggested that institutional shareholders may behave differently from other external shareholders during takeover contests. Shivdasani (1993) also usefully distinguished between affiliated and unaffiliated shareholders in his study of hostile takeovers in the US. In this study we have defined institutional ownership as insurance companies, pension funds and investment trusts and affiliated shareholders as those companies, institutions and individuals with family links with the business.[9] All other shareholders are defined as being unaffiliated. Data used to compile the board composition and ownership variables has been obtained from a number of sources: the published report and accounts of targets and non-target companies for the financial year preceding the bid as well as various issues of: *The Directory of Directors*, *The Stock Exchange Yearbook* and *The Arthur Andersen Corporate Register*[10]—a twice-yearly publication that provides board and ownership information on all UK listed companies.

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[3] In compiling our list of directors we use the annual report and accounts to identify which directors were serving at the financial year end. Directors appointed between this date and the publication of the annual report and accounts are excluded. However, directors resigning between the financial year end and the publication of the annual report and accounts are included.

[4] Since the publication of the *Report on the Financial Aspects of Corporate Governance* in 1992, UK listed companies provide a great deal of biographical information on their directors. However, since our study utilises disclosures made between 1988 and 1992, insufficient information was available on a consistent basis to apply a similar measure of non-executive affiliation in this study.

[5] We are grateful to an anonymous referee for suggesting this proxy for non-executive affiliation.

[6] The primary sources of additional directorship were directors' biographies in the annual report and accounts as well as the biographical section of the *Arthur Andersen Corporate Register*.

[7] We are grateful to an anonymous referee for this suggestion.

[8] Companies Act 1989 has lowered this threshold to 3%. Since this change only became operational in 1992, the 5% level is used in this study.

4. Empirical results

Table 2 reports summary statistics and means differences in respect of board composition and ownership structure in the samples of hostile target and non-target firms. Of directors in target firms, 40.1% are non-executive compared to 36.07% in non-targets. Utilising non-executive tenure as a measure of affiliation, we find that 20% of directors in target firms are unaffiliated compared to 14.95% unaffiliated directors in non-target firms. Non-executive directors in target firms possess an average of 0.44 additional directorships compared to non-executives in non-targets who possess an average of 0.58 additional directorships. Of the three board composition variables, only the proportion of unaffiliated directors shows a significant difference between the two samples; 36% of targets have the same person occupying the positions of CEO and company chairman compared to 62% of non-targets, while 9% of targets have the company founder as CEO and company chairman compared to 29% of non-targets. The difference between the subsamples is significant at the 1% level for both variables.

Some further significant differences emerge between the samples in respect of ownership structure. The degree of executive share ownership is significantly greater in the case of non-targets compared to targets. CEO ownership in targets is 1.10% which is significantly lower than the 3.86% for non-targets. This result is closely mirrored in respect of non-CEO ownership where non-targets also possess a significantly larger stake. The ownership of non-executive directors is also lower in the case of takeover targets (1.25%) compared to non-targets (2.32%). However, the difference in the case of non-executive directors is not significant. The aggregate ownership of institutional shareholders in target firms is 9.68% compared to 8.15% for non-targets with corresponding non-institutional ownership stakes of 13.95% and 11.36%—neither differences are significant. Distinguishing between affiliated and unaffiliated external shareholders provides some significant differences between targets and non-targets. Even though no significant difference exists in respect of affiliated shareholders, ownership by unaffiliated shareholders is significantly greater in targets compared to non-targets (20.48% and 14.58% respectively).

The presence of a higher proportion of non-executive and unaffiliated directors on the boards of target firms suggests that targets possess stronger board governance compared to non-targets—supporting the view that hostile takeovers are utilised only when strong governance mechanisms exist but are ineffective. In this respect our univariate results are broadly similar to Shivdasani's (1993) findings in the US. However, unlike our findings, the difference in respect of non-executive directors (using the same definition) is significant in Shivdasani's study. If we assess non-executives' monitoring potential by the number of additional directorships held, non-targets possess better quality non-executives and therefore supports the contention that hostile takeovers and board composition may be substitutes.

Again, unlike our findings, the mean number of additional directorships held by non-executive directors in Shivdasani's (1993) study is marginally significant. The comparisons in respect of board leadership suggest that the existence of CEO/chairman duality serves to prohibit takeovers—possibly bidders are discouraged by the presence of an entrenched CEO (which CEO/chairman duality may indicate). Furthermore, the fact that CEO/chairmen in non-targets are more likely to be the company founder, supports this interpretation. Similar to Shivdasani (1993) and Song and Walkling (1993) we find greater executive share ownership in non-target firms. This finding provides a useful insight into existing studies that consistently report greater executive ownership in friendly as opposed to hostile bids and successful as opposed to unsuccessful bids. Viewed in this context, it appears that hostile bids are more likely to be launched when executives own a relatively insignificant proportion of equity—presumably in order to increase the bid's likelihood of success.

Our findings regarding unaffiliated shareholders mirror those of Shivdasani (1993), which suggests

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[9] Shareholders were classified as being affiliated where such affiliations were either explicitly mentioned in the company's annual report and accounts, or where shareholders names (including nominee companies) suggested such an affiliation.

[10] Published by Hemington Scott and renamed *The Price Waterhouse Corporate Register* in 1995.

Table 2
Board composition and ownership characteristics for a sample of hostile takeover targets and a control sample of industry- and size-matched non-target firms

	Hostile takeover targets (n=58)				*Control group of non-targets (n=58)*					
Variables	*mean*	*median*	*min*	*max*	*mean*	*median*	*min*	*max*	*Means difference t-statistic*	*Median difference Wilcoxon Z*
Percentage of non-executive directors[a]	40.10	38.75	0.0	80.0	36.07	40.0	0.0	61.54	1.37 (0.173)	−0.90 (0.368)
Percentage of unaffiliated directors[b]	20.00	22.22	0.0	50.0	14.95	16.67	0.0	40.0	2.21 (0.029)	2.12 (0.034)
Mean number of additional directorships held by each non-executive director[c]	0.44	0.33	0.0	3.25	0.58	0.45	0.0	2.50	−1.24 (0.217)	−1.23 (0.219)
BOSS[d]	0.36	0.0	0.0	1.0	0.62	1.0	0.0	1.0	−2.86 (0.005)	−2.77 (0.006)
BOSS is company founder[e]	0.09	0.0	0.0	1.0	0.29	0.0	0.0	1.0	−2.92 (0.004)	−2.83 (0.005)
Ownership by CEO (%)	1.10	0.06	0.0	7.45	3.86	0.85	0.0	31.44	−3.11 (0.002)	−3.05 (0.002)
Ownership by executive directors excluding CEO (%)	0.67	0.07	0.0	6.25	3.40	0.51	0.0	23.96	−3.79 (0.000)	−3.78 (0.000)
Ownership by non-executive directors (%)	1.25	0.04	0.0	17.20	2.32	0.07	0.0	35.69	−1.22 (0.227)	−1.12 (0.263)
Ownership by institutional 5% external shareholders (%)[f]	9.68	7.34	0.0	50.59	8.15	6.13	0.0	35.16	0.80 (0.426)	0.65 (0.515)
Ownership by non-institutional 5% external shareholders (%)	13.95	8.44	0.0	47.64	11.36	5.01	0.0	67.10	0.88 (0.382)	1.20 (0.230)
Ownership by affiliated 5% external shareholders (%)[g]	3.16	0.0	0.0	47.64	4.92	0.0	0.0	45.70	−1.03 (0.307)	−1.13 (0.260)
Ownership by unaffiliated 5% external shareholders (%)	20.48	16.09	0.0	65.40	14.58	10.98	0.0	68.83	1.99 (0.049)	1.91 (0.057)

p-values are in parentheses.

[a] Non-executive directors are directors who are not also employees of the firm.

[b] Unaffiliated directors are non-executives who have served as directors for less than 5 years.

[c] Additional directorships represent directorships in other UK listed companies.

[d] Binary variable: = 1 if same indivudual holds the positions of company chairman and CEO: = 0 otherwise.

[e] Binary variable: = 1 if 'BOSS' is company founder: = 0 otherwise.

[f] Institutional shareholders represent insurance companies, pension funds and investment trusts.

[g] Affiliated shareholders represent companies, institutions and individuals with business or family ties with the firm.

that hostile bids are more likely to occur when large shareholders are independent from management.

Table 3 reports Pearson correlation coefficients of the governance and size variables used in the study. Correlations are useful in the context of this paper because they are capable of providing important insights on the relationship between the internal governance and ownership variables. In addition, the inclusion of the log of market capitalisation allows us to analyse the way governance mechanisms alter depending on firm size. Demsetz and Lehn (1985) argue that as firm size increases the costs of alternative forms of internal governance change. For example, monitoring through large external ownership becomes more expensive for shareholders as the market value of the firm increases. Therefore shareholders in large firms are less likely to monitor through ownership and more likely to utilise alternative forms of internal governance such as the use of non-executive directors and/or executive share ownership.

Panel A reports correlation coefficients for the sample of 58 hostile targets and panel B provides correlations for the matched sample of non-targets. In both samples the proportion of non-executive directors is positively correlated with both the proportion of unaffiliated directors and the mean number of additional directorships held by each non-executive director. In the sample of non-targets the proportion of non-executives is also positively correlated with non-executive share ownership and company size. The proportion of non-executives is negatively associated with the presence of the same individual in the positions of CEO and chairman and executive share ownership in both samples, but negatively associated with the presence of company founder and affiliated external shareholders only in the sample of non-targets.

We suggested that by including the log of market capitalisation we are capable of obtaining a richer understanding of the relationship between the different governance mechanisms used by firms and the impact of an exogenous factor—such as firm size—on the emphasis placed on each mechanism. In terms of the relationship between ownership and firm size, a number of important correlations emerge from Table 3. In the case of targets, a significant negative association exists between firm size and the director ownership variables but the strength of the relationship between size and the external ownership variables is much weaker. However, in the case of non-targets, even though the negative association between size and director ownership variables also exists, there is also a significant negative association with both the ownership of institutions and unaffiliated ownership. Overall, the correlations between size and ownership in the sample of non-targets is expected, since monitoring by large blockholders is expected to be more expensive compared to alternative forms of internal monitoring and consequently more emphasis is expected to be placed on the monitoring of non-executive directors. The correlations in the sample of targets show a weaker substitution between size, external ownership and board monitoring. Neither board composition nor external ownership are significantly associated with size—indeed, size is negatively associated with the proportion of unaffiliated directors.

Table 4 reports the results of a logistic regression of takeover likelihood using board and ownership characteristics. The results of three logit models are shown. In Model 1 the proportion of non-executive directors and the mean number of additional directorships is used to represent board monitoring, while external blockholder ownership is represented by the ownership of institutional and non-institutional shareholders. In Model 2, the proportion of non-executive directors is substituted by the proportion of unaffiliated directors, we include the presence of the firm founder, and external ownership is represented by affiliated and unaffiliated shareholder variables. In Model 3, we include two interactive variables representing the ownership of BOSS multiplied by CEO ownership and the ownership of non-executives multiplied by non-executive representation.

In terms of the monitoring potential of the board, neither the proportion of non-executive directors nor the proportion of unaffiliated directors has a significant impact on takeover likelihood. The multivariate results in respect of the proportion of unaffiliated directors differs from the univariate comparisons in Table 2 where the boards of hostile targets possessed a significantly greater proportion of unaffiliated directors. In all three regressions the mean number of additional directorships held by non-executives has a negative (marginally significant) impact on takeover likelihood. Even though neither the presence of the same individual as CEO and chairman nor the presence of the company founder have a significant impact on the likelihood of a hostile bid, the ownership stake of individuals serving as CEO and chairman has a significant negative impact on the likelihood of a hostile bid. This suggests that the combination of CEO and chairman is more potent in discouraging a potential bid when the CEO/chairman also possesses a significant ownership stake in the company.

Our results in respect of board composition are broadly similar to Shivdasani (1993), who finds that the mean number of additional directorships held by non-executives has a negative impact on takeover likelihood (Shivdasani's result was significant at 1%). He also failed to find either the proportion of non-executive directors or the proportion of unaffiliated directors significantly impacting on the likelihood of a hostile bid.

Table 3
Pearson correlation coefficients of the board and ownership variables

Panel A: Sample of hostile targets (n=58)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1. Percentage of non-executive directors[a].	1.0*												
2. Percentage of unaffiliated directors[b].	0.31*	1.0											
3. Mean number of additional directorships held by each non-executive director[c].	0.23	−0.11	1.0										
4. BOSS[d].	−0.25	0.03	0.02	1.0									
5. BOSS is company founder[e].	−0.09	0.13	0.07	0.41**	1.0								
6. Ownership by CEO (%).	−0.13	0.14	−0.10	−0.01	0.28*	1.0							
7. Ownership by executive directors excluding CEO (%).	−0.35**	0.09	−0.26*	0.12	0.20	0.51**	1.0						
8. Ownership by non-executive directors (%)	0.12	0.05	−0.20	0.03	−0.07	0.29*	0.33*	1.0					
9. Ownership by institutional 5% external shareholders (%)[f]	0.01	0.14	−0.16	−0.05	−0.04	−0.19	−0.16	−0.11	1.0				
10. Ownership by non-institutional 5% external shareholders (%)	−0.11	−0.09	0.13	0.03	0.11	0.18	0.06	0.03	−0.05	1.0			
11. Ownership by affiliated 5% external shareholders (%)[g]	−0.01	−0.04	0.09	0.19	−0.01	0.02	−0.01	0.05	−0.01	0.46**	1.0		
12. Ownership by unaffiliated 5% external shareholders (%)	−0.09	0.03	−0.12	−0.01	0.08	0.02	−0.05	−0.07	0.61**	0.64**	−0.08	1.0	
13. Log of market capitalisation.	0.06	−0.26*	0.21	0.02	−0.22	−0.44**	−0.30*	−0.38**	−0.13	−0.17	−0.15	−0.16	1.0

Panel B: Matched sample of non-targets (n=58)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Percentage of non-executive directors[a]	1.0												
2. Percentage of unaffiliated directors[b]	0.40**	1.0											
3. Mean number of additional directorships held by each non-executive director[c]	0.26*	0.32*	1.0										
4. BOSS[d]	−0.23	0.04	−0.05	1.0									
5. BOSS is company founder[e]	−0.21	−0.09	−0.18	0.50**	1.0								
6. Ownership by CEO (%)	−0.09	−0.05	−0.21	0.26*	0.63**	1.0							
7. Ownership by executive directors excluding CEO (%)	−0.27*	−0.25	−0.26*	−0.05	0.17	0.17	1.0						
8. Ownership by non-executive directors (%).	0.35**	−0.10	0.00	−0.12	−0.01	0.06	0.08	1.0					
9. Ownership by institutional 5% external shareholders (%)[f].	0.02	−0.09	0.02	0.06	−0.09	−0.11	−0.02	0.08	1.0				
10. Ownership by non-institutional 5% external shareholders (%).	−0.18	0.03	−0.28*	0.10	0.09	−0.04	0.12	0.05	−0.14	1.0			
11. Ownership by affiliated 5% external shareholders (%)[g].	−0.26*	−0.09	−0.22	0.05	0.13	−0.01	0.25	0.11	−0.27*	0.78**	1.0		
12. Ownership by unaffiliated 5% external shareholders (%).	−0.01	0.04	−0.15	0.11	−0.05	−0.10	−0.05	0.03	0.68**	0.50**	0.01	1.0	
13. Log of market capitalisation	0.15	0.14	0.42**	−0.10	−0.24	−0.32*	−0.42**	−0.04	−0.41**	−0.22	−0.09	−0.46**	1.0

* Significant at 5%
** Significant at 1%
[a] Non-executive directors are directors who are not also employees of the firm.
[b] Unaffiliated directors are non-executives who have served as directors for less than 5 years.
[c] Additional directorships represent directorships in other UK listed companies
[d] Binary variable: = 1 if same individual holds the positions of company chairman and CEO: = 0 otherwise.
[e] Binary variable: = 1 if 'BOSS' is company founder: = 0 otherwise.
[f] Institutional shareholders represent insurance companies, pension funds and investment trusts.
[g] Affiliated shareholders represent companies, institutions and individuals with business or family ties with the firm.

Table 4
Results of a logistic regression of takeover likelihood using board and ownership characteristics for a sample of hostile takeover targets and a control sample of industry- and size-matched non-target firms

	Model I	*Model II*	*Model III*
Percentage of non-executive directors[a]	−0.0053		
	(0.7544)		
Percentage of unaffiliated directors[b]		0.0239	0.0220
		(0.2061)	(0.2521)
Mean number of additional directorships held by each non-executive director[c]	−0.7079 (0.0713)	−0.6793 (0.0781)	−0.6478 (0.0935)
BOSS[d]	−0.7430		
	(0.1125)		
BOSS is company founder[e]		−0.4382	
		(0.5694)	
Ownership by CEO	−0.1461	−0.1310	
	(0.0595)	(0.1344)	
BOSS* ownership by CEO			−0.2424
			(0.0361)
Ownership by executive directors excluding CEO	−0.2934	−0.2286	−0.2514
	(0.0107)	(0.0389)	(0.0237)
Ownership by non-executive directors	−0.0254	−0.0222	
	(0.6088)	(0.6470)	
Ownership by non-executive directors*% non-executive directors			−0.0007
			(0.4994)
Ownership by institutional 5% external shareholders[f]	−0.0030		
	(0.8892)		
Ownership by non-institutional 5% external shareholders	0.0112		
	(0.4724)		
Ownership by affiliated 5% external shareholders[g]		−0.0021	−0.0062
		(0.9365)	(0.8230)
Ownership by unaffiliated 5% external shareholders		0.0092	0.0084
		(0.5424)	(0.5741)
Return on capital employed	−0.0439	−0.0448	−0.0439
	(0.0474)	(0.0423)	(0.0483)
Constant	2.3177	1.2106	1.2403
	(0.0201)	(0.1067)	(0.0963)
Likelihood ratio index[h]	0.241	0.216	0.239
Likelihood ratio statistic[i]	77.432*	66.528*	73.586*

p-values are in parentheses.
*Significant at 1%
[a] Non-executive directors are directors who are not also employees of the firm.
[b] Unaffiliated directors are non-executives who have served as directors for less than 5 years.
[c] Additional directorships represent directorships in other UK listed companies.
[d] Binary variable: = 1 if same individual holds the positions of company chairman and CEO: = 0 otherwise.
[e] Binary variable: = 1 if 'BOSS' is company founder: = 0 otherwise.
[f] Institutional shareholders represent insurance companies, pension funds and investment trusts.
[g] Affiliated shareholders represent companies, institutions and individuals with business or family ties with the firm.
[h] The likelihood ratio index is equal to (1 − log likelihood at convergence/log likelihood at zero). It is the analog of R-square in multiple regression.
[i] The likelihood ratio statistic is defined as: 2 × (log likelihood at convergence − log likelihood at zero). The statistic tests the null hypothesis that all model parameters are equal to zero. Under this hypothesis, the likelihood ratio statistic is asymptotically distributed as a chi-square. The degrees of freedom are equal to the number of parameters in the model.

Similar to a number of recent studies on takeover activity, we find that director share ownership has an important role in explaining the likelihood of a hostile bid. In all three models the ownership stake of executive directors excluding the CEO has a negative and significant impact on takeover likelihood. This finding is consistent with both Song and Walkling (1993) and Shivdasani (1993), both of whom report evidence of a significant negative relationship between takeover likelihood and managerial ownership in the context of US takeovers. The ownership of non-executive directors does not appear to influence the likelihood of a hostile takeover bid. The external shareholder variables are not significant in any of the logit models. The absence of a significant relationship in respect of external affiliation is at variance with Shivdasani's (1993) US study, where unaffiliated ownership was found to be positively associated with the likelihood of a hostile takeover bid.

Finally, in all three logit models return on capital employed has a negative and significant impact on takeover likelihood. This provides further evidence for the governance role of takeovers suggesting that hostile targets exhibit inferior accounting performance compared to non-targets.

Weisbach (1993) suggests that a useful method of discussing the regression results is by examining the predicted probabilities from the logit equations. Table 5 presents the estimated probabilities for our study. At the base case, where all the variables are at their mean values, the probability of a hostile takeover is 44.9%. Table 5 presents the probability of takeover when each of the explanatory variables are at their 10th and 90th percentile but holding all the remaining variables at their mean values. The results provide useful insights on the impact of changing governance measures on takeover likelihood.

For example, as the number of additional directorships held by each non-executive director increases from zero to about 1.33, the likelihood of a hostile takeover reduces from 54% to 31.3%. Similarly, having the same individual as CEO and chairman decreases the probability of a takeover bid from 54% to 35.9%. The strongest influence on takeover likelihood comes from the level of ownership of executive directors excluding ownership of the CEO. By increasing executive share ownership from 0.007% to 7.821%, the probability of a hostile takeover reduces from 60% to 13%. Table 5 also illustrates the weak influence of non-executive directorships, non-executive share ownership and institutional ownership on the likelihood of a hostile takeover bid.

Although the main objective of our study is to examine board composition and ownership in the context of takeover likelihood, an interesting ex-

Table 5
Estimated probabilities of a hostile takeover as a function of board composition and ownership characteristics (probability of a hostile takeover with all variables at their means = 0.449)[a]

Variables	*Value at 10th percentile*	*Value at 90th percentile*	*Probability at 10th percentile*	*Probability at 90th percentile*
Percentage of non-executive directors[b]	17.353	57.143	0.477	0.425
Mean number of additional directorships held by each non-executive director[c]	0.000	1.333	0.540	0.313
BOSS[d]	0.000	1.000	0.540	0.359
Ownership by CEO	0.002	7.386	0.540	0.285
Ownership of executive directors excluding CEO	0.007	7.821	0.600	0.130
Ownership by non-executive directors	0.000	6.992	0.461	0.417
Ownership by institutional 5% external shareholders[e]	0.000	24.218	0.456	0.438
Ownership by non-institutional 5% external shareholders	0.000	37.543	0.415	0.519
Return on capital employed	2.220	29.033	0.599	0.315

[a] The logit regression in Model 1 of Table 4 is used to estimate the probabilities.
[b] Non-executive directors are directors who are not also employees of the firm.
[c] Additional directorships represent directorships in other UK listed companies.
[d] Binary variable: = 1 if same individual holds the positions of company chairman and CEO: = 0 otherwise.
[e] Institutional shareholders represent insurance companies, pension funds and investment trusts.

tension is to see whether internal governance characteristics differ between successfully acquired targets and takeover bids that fail. Table 6 presents results of a univariate analysis of board, ownership and size characteristics for the successful and unsuccessful targets and the matched samples of non-targets. In terms of board composition and leadership, targets retaining their independence possess a significantly greater proportion of non-executive and unaffiliated directors compared to non-targets. Unsuccessful targets are also significantly less likely to exhibit CEO/chairman duality compared to non-targets. No such differences exist between targets and non-targets in the case of successful bids. This suggests that targets which successfully defend their independence have stronger board governance and leadership compared to non-targets. When the two types of targets are compared, unsuccessfully acquired firms possess a greater proportion (marginally significant) of unaffiliated directors than acquired firms.

All the executive ownership variables are significantly larger in non-targets compared to targets regardless of bid outcome. However, no significant differences exist between the subsamples of targets. None of the external ownership variables differ significantly between the subsamples of targets and non-targets. However, successfully acquired firms possess a marginally lower proportion of both institutional and unaffiliated share ownership compared to their unsuccessful counterparts. This finding provides some support for Black and Coffee's (1994) assertion that UK institutional shareholders are frequently supportive of incumbent management in hostile bids. Targets retaining their independence show significantly inferior performance compared to the matched sample of non-targets but no performance differences are identified between the two categories of targets. Successfully acquired firms are significantly larger than unacquired firms. This suggests that target management may find it more difficult to retain independence in larger firms where there are expected to be a greater number of small shareholders.

5. Conclusion

A primary objective of this study is to examine whether hostile takeovers represent a governance mechanism of last resort launched either when internal governance is weak, or when appropriate internal governance exists but is ineffective in ensuring that managers pursue shareholder objectives.

In terms of the proportion of non-executive directors, we find no significant differences between the two samples. When we further categorise non-executives in respect of their affiliation with management (i.e. defining affiliated as those directors who have served for more than five years) we find a greater proportion of unaffiliated directors on the boards of target firms. We find non-executives in non-target firms possess a greater number of additional directorships than their counterparts in target firms. Even though this difference was not significant in the univariate analysis, the logit regression of takeover likelihood finds that the number of additional directorships has a significant negative impact on the likelihood of a hostile bid. Shivdasani (1993), who reports a similar result in the US, suggests that additional directorships is a good proxy for director quality since 'better' directors are expected to serve on more boards. We also find that non-targets are more likely to have the same individual serving as company chairman and CEO. Investigating this finding further, we find that in non-targets when CEO/chairman duality occurs, almost half the CEOs are company founders compared to only 25% in the case of targets. This suggests that the presence of the company founder discourages potential bidders from launching a hostile bid. Furthermore, our logit model suggests that while CEO/chairman duality does not necessarily reduce the likelihood of a bid, CEO/chairman duality coupled with CEO ownership has a significant negative impact on bid likelihood.

Executive share ownership has a negative and significant impact on the likelihood of a hostile takeover bid. This finding mirrors similar work in the US, which consistently finds executive ownership negatively related to takeover likelihood (Song and Walkling, 1993; Shivdasani, 1993). Two explanations have been offered for this finding. Share ownership by directors may serve to reconcile the interests of managers and shareholders and hence reduce the need for takeover discipline. Alternatively, if executives enjoy some rents from their jobs, they are expected to resist all takeovers and such resistance is more effective when they also own a large proportion of firm equity.

In the case of hostile takeovers it appears that bidders are less likely to launch a takeover when executive ownership is significant. This interpretation is reinforced by the absence of a link between executive ownership and takeover outcome in our sample. Even though we differentiate large external shareholders between institutional and non-institutional and affiliated and unaffiliated, we find little evidence that large blockholders play a role in takeover likelihood. Interestingly, we find some evidence that institutional and unaffiliated shareholders may support managers in smaller targets to defeat unwanted bids. The univariate analysis finds that target firms exhibit a significantly lower return on capital employed compared to non-targets, while the multivariate analysis finds that return on capital employed has a significant negative impact on the likelihood of a hostile bid. Even though the ownership of unaffiliated blockholders

Table 6

Board composition and ownership characteristics for a sample of hostile takeover targets and a control sample of industry- and size-matched non-targets based on bid outcome.

		Successful takeovers (n=32)		*Unsuccessful takeovers (n=26)*		*Means differences*					
						Successful targets vs. non-targets		*Unsuccessful targets vs. non-targets*		*Successful targets vs. unsuccessful targets*	
		Targets mean	*Non-targets mean*	*Targets mean*	*Non-targets mean*	*t-statistic*	*p-value*	*t-statistic*	*p-value*	*t-statistic*	*p-value*
1.	Percentage of non-executive directors[a]	38.34	38.19	42.26	33.47	0.94	0.353	2.10	0.041	−0.90	0.372
2.	Percentage of unaffiliated directors[b]	17.04	15.60	23.31	14.16	0.44	0.663	3.01	0.004	−1.92	0.061
3.	Mean number of additional directorships held by each non-executive director[c]	0.45	0.67	0.44	0.47	−1.60	0.114	−0.21	0.834	0.07	0.943
4.	BOSS[d]	0.44	0.47	0.27	0.81	−0.25	0.806	−4.54	0.000	1.32	0.191
5.	BOSS is company founder[e]	0.06	0.28	0.12	0.31	−2.39	0.020	−1.71	0.093	−0.70	0.484
6.	Ownership by CEO	1.00	3.50	1.23	4.31	−2.29	0.026	−2.09	0.042	−0.40	0.688
7.	Ownership by executive directors excluding CEO	0.61	3.96	0.75	2.72	−3.04	0.003	−2.28	0.027	−0.37	0.710
8.	Ownership by non-executive directors	0.64	1.38	2.00	3.49	−1.17	0.245	−0.83	0.410	−1.59	0.118
9.	Ownership by institutional 5% external shareholders[f]	7.38	6.10	12.51	10.67	0.60	0.552	0.56	0.576	−1.79	0.079
10.	Ownership by non-institutional 5% external shareholders	12.46	9.02	15.78	14.24	0.94	0.353	0.32	0.748	−0.82	0.414
11.	Ownership by affiliated 5% external shareholders[g]	3.56	3.97	2.66	6.10	−0.19	0.853	−1.26	0.212	0.41	0.686
12.	Ownership by unaffiliated 5% external shareholders	16.29	11.14	25.64	18.81	1.43	0.157	1.47	0.149	−2.13	0.037
13.	Return on capital employed	13.17	17.04	12.61	21.45	−1.30	0.199	−2.32	0.025	0.19	0.851
14.	Log of market capitalisation	8.24	8.10	7.83	7.71	0.79	0.431	0.673	0.504	2.35	0.022

[a] Non-executive directors are directors who are not also employees of the firm.

[b] Unaffiliated directors are non-executives who have served as directors for less than 5 years.

[c] Additional directorships represent directorships in other UK listed companies

[d] Binary variable: = 1 if same individual holds the positions of company chairman and CEO: = 0 otherwise.

[e] Binary variable: = 1 if 'BOSS' is company founder: = 0 otherwise.

[f] Institutional shareholders represent insurance companies, pension funds and investment trusts.

[g] Affiliated shareholders represent companies, institutions and individuals with business or family ties with the firm.

is significantly greater in the case of non-targets in the univariate analysis, none of the blockholder variables appear to have a significant impact on takeover likelihood in our logit models.

Even though our study provides some important insights into the relationship between internal and external governance, a number of limitations exist. First, an important limitation of our study is the static nature of the analysis. By focusing on board composition and ownership characteristics immediately prior to the hostile bid, we are unable to comment on the quality of targets' internal governance over an extended period prior to the bid. For example, information on target performance and any consequent governance responses in the years prior to the bid would provide us with a more comprehensive understanding of the relationship between internal and external control. Furthermore, in addition to analysing the governance structure of targets prior to a bid, a useful extension of the study is to examine the impact of hostile bids on changes in governance characteristics of those targets successfully retaining their independence.

Second, our results highlight a negative relationship between executive ownership and the likelihood of a hostile bid. While this finding suggests that firms with significant executive ownership are less likely to require the additional governance of takeovers since executive ownership may reconcile the interests of managers and owners, an alternative interpretation may be that executives possessing significant ownership stakes are capable of insulating themselves from the threat of a hostile bid. Our study is unable to identify which of these explanations is dominant.

Three, our focus on the potential for shareholder monitoring suggests a relatively easy substitution between hostile takeovers and internal governance. However, the significantly higher costs associated with a hostile takeover relative to the costs of recruiting additional non-executives, for example, suggests that internal and external governance are unlikely to be perfect substitutes. Finally, a number of researchers have argued that, rather than serving as a mechanism of governance, takeovers represent a re-distribution of wealth in favour of shareholders at the expense of other stakeholders (Schleifer and Vishny, 1988). Furthermore, the clustering of takeover activity at certain periods suggests that correction of governance deficiencies may only be a partial explanation for hostile takeover activity.

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The economics of *Accounting for Growth*

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Abstract—This is a study of the accounting policies of the leading UK companies analysed by Terry Smith in *Accounting for Growth* (1992). Smith's critical survey achieved a certain notoriety at the time both for the content, which catalogued important ambiguities in UK GAAP, and also because the author was a leading investment analyst whose employers attempted to suppress the publication. The events that led to his dismissal were extensively reported in the financial press. In this paper we revisit the original analysis in the context of recent advances in the economics of accounting policy choice. Agency theory variables are used to predict the individual accounting policy choices and combinations of policies in Terry Smith's analysis. In particular, size, gearing, the presence of an industry regulator and industry classification are good predictors of accounting policy choices. Our results are stronger for the whole set of accounting policies than for each individual policy. This is consistent with accounting policy choice being a strategic and comprehensive selection from interactive policies rather than a series of independent decisions.

1. Introduction

This study investigates creative accounting in the UK from a costly contracting perspective, using the survey data published in a famous book, *Accounting for Growth.* When the book was published in 1992, its author Terry Smith was the head of UK Company Research at UBS Phillips and Drew. His claims about the implications of 'unhealthy' accounting policy choices for investment performance were seen as a direct attack upon some of the UK's largest and most respected enterprises.[1]

UBS Phillips and Drew, who included some of the companies criticised by Smith among their largest clients, tried to suppress publication and in dismissing their erstwhile head of research they inadvertently fuelled the explosion of publicity surrounding the launch of the book. The resulting press attention achieved considerable currency for a sinister interpretation of accounting innovation and the accounting regulators, entering the dispute in support of Smith, intensified this effect. Most of the same policy areas were also identified as problems by the Accounting Standards Board in its radical review of the regulations and restructuring exercise of 1990, with the head of the ASB, Sir David Tweedie, being quoted:

> 'Terry identified exactly the same problems as we did with the accountancy world. I think of the 12 issues he highlighted we have now dealt with nine of them.' (Hamilton, 1993).

The data provided by Smith are particularly interesting since they represent an authoritative identification of important 'creative' accounting policies and the companies that were employing them, compiled by a professional and high-ranking analyst. Smith's selection of policies gives the practitioner's view of the major techniques of creative accounting current at the time. The dataset also makes it possible to view the portfolio of interactive policies adopted by each company.

The public debate over *Accounting for Growth* was expressed primarily in terms of representational faithfulness and the requirement for truth and fairness. In these terms, the use of creative accounting is almost invariably judged unethical since its assumed motive is to conceal a poor performance from shareholders. The main premise of the *Accounting for Growth* dataset is that it identifies the instruments by which companies increase reported earnings (Smith and Hannah, 1991, p.3), although no evidence is presented by the authors of the report in support of this claim. The popular view reflected in the financial press is that share prices closely reflect published earnings (as demonstrated by quoted P/E ratios) and that companies can engineer changes in their own share price by the use of creative accounting. The 1996 edition of *Accounting for Growth* includes the text of a *Times* article, which claims that:

> 'Fifteen months after Terry Smith's controversial book, *Accounting for Growth*, climbed into the best-sellers lists, event after event is

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[1] For example, see Jack and Cohen (1992).

> proving the maverick analyst right.' (Hamilton, 1993).

The events in question were a number of 'corporate failures' listed in Table 1. In this context, the term 'failure' appears to encompass restructuring, senior management changes, shares that underperform the market and rights issues. This analysis is clearly selective and impressionistic. No mention is made of the fate of the remaining 198 companies in the *Accounting for Growth* sample, no definitions are provided for terms such as 'under-performance' and no explanation given for the choice of these criteria as illustrations of corporate failure. The article illustrates the simple popular view of creative accounting in the press and an adulatory belief in the prophecies of Terry Smith.

A more sophisticated theoretical analysis of creative accounting can be found in Tweedie and Whittington (1990), where accounting policy choice is analysed in the traditional terms of representational faithfulness, income recognition criteria, economic substance and the requirement for comparability. This taxonomy provides a more appropriate framework in which to consider the economic effect of creative accounting than does the analysis in Smith (1992), which is little more than a catalogue of techniques. The results presented in this paper provide a link between the empirical work of Smith (1992) and the theoretical developments of Tweedie and Whittington (1990).

In part, the motivation for this paper is to examine the empirical data provided by Smith in a more rigorous theoretical context. We therefore investigate the accounting policy choices in an efficient contracting context, as being systematically related to firms' contracts based explicitly on accounting numbers and situations where accounting numbers are used.[2]

The empirical effect of costly contracting is that accounting methods adopted are systematically related to characteristics of the firm and/or its industry. We find that the predictors of 'creative' accounting policy choice are industry, size, gearing and the presence of an industry regulator. Our results have more explanatory power for the whole set of accounting policies chosen by a company than for each individual policy, a result consistent with US evidence (e.g. Zmijewski and Hagerman, 1981) that the domain is one of strategic choice among policies rather than a sequence of independent binary choices.

The efficient contracting literature now draws a distinction between 'opportunistic' policy choices and 'equilibrium' choices that are related to the individual circumstances of the firm (for example, Zimmer, 1986). Smith's contention in *Accounting for Growth* is that policies are chosen as a device to flatter a poor performance and thus he concentrates almost entirely upon 'opportunistic' arguments. Our results indicate that earnings enhancement is not the sole consideration in such decisions and that policies are selected for other economic reasons, which may be 'equilibrium' factors. Policy choices can be predicted from other economic variables, and the relationship between such choices and corporate performance is more subtle and complex than Smith's commentary would lead us to believe.

Table 1
'How Smith's culprits came unstuck' (From the *Sunday Times* 14/11/93)

'Companies using the most dubious accounting practices'

Tiphook (4)*	In talks with banks, debts soar
Queen's Moat (6)	Financial reconstruction under way
Trafalgar House (8)	Auditors, chairman and chief executive depart; huge losses; two rights issues
Albert Fisher (7)	Losses; chairman departs
British Aerospace (7)	Record losses; rights issue
Ratners (7)	Founder departs; huge losses
Lonrho (6)	Huge changes in way group is run
Grandmet (9)	Shares underperform
Bass (6)	Shares underperform
Ladbroke (8)	Chairman steps down

*Figure in parentheses denotes the number of dubious accounting policies used.

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[2] See Watts and Zimmerman (1986, ch. 11) for a review of the relevant literature.

The paper is in six sections: a description of the policy choice data follows this introduction; then the review of literature; identification of the relevant explanatory variables and description of the regression models employed; the empirical results and, finally, conclusions.

2. The nature and relevance of the *Accounting for Growth* dataset

At the heart of *Accounting for Growth* is the 'Major companies accounting health check' which reports the incidence of 12 accounting policies in the published results of over 200 of the largest UK companies. This analysis followed on from a similar study, published in-house, and written jointly with another leading analyst, Richard Hannah (Smith and Hannah, 1991). The data for both analyses were collected by several different teams of analysts at Phillips and Drew who specialised in particular industry areas. The twelve creative accounting policies identified in the report were:

Creative accounting policies identified in Smith (1992):

1. Pre-acquisition write-down, which is the use of provisions to cover fair value adjustments in respect of acquisitions;
2. Disposals above the line or deconsolidation, which is the disposal of fixed assets/businesses taken through the profit and loss account or deconsolidation of subsidiaries or classifying associates as trade investments prior to sale;
3. Deferred consideration, which is consideration for an acquisition being contingent on the future performance of the acquired business (earn-outs);
4. Mis-classification of extraordinary and exceptional items;
5. Off balance-sheet financing;
6. Contingent liabilities;
7. Capitalisation of interest and other costs;
8. Brand accounting;
9. Changes in depreciation policy;
10. The use of convertible stock with put options or variable rate preference stocks;
11. Accounting for pension fund surpluses;
12. Currency mismatching.

The 'Major companies accounting health check' documented which companies employed which techniques. The degree of creativity in the accounts of each of the companies was measured on a zero to twelve scale by awarding a point (or 'blob') for each technique. The advice to readers was to avoid companies with a high 'blob score'. The 1991 survey (Smith and Hannah, 1991) reached a smaller audience since it was published primarily as a Phillips and Drew in-house report. This version of the report was based upon a smaller sample of companies (186) and a slightly different set of accounting policies.

Creative accounting policies identified in Smith and Hannah (1991):

1. Changes in provisions;
2. Extraordinary items*;
3. Off balance-sheet financing*;
4. Capitalisation of interest*;
5. Significant non-trading profits;
6. Brand accounting*;
7. Changes in depreciation policy*;
8. Accounting for pension fund surpluses*;
9. Deferred consideration (earn-outs)*;
10. Currency mis-matching*;
11. Unusually low tax charges.

(* = Accounting policy also examined in the 1992 study).

One of the original objectives of the Phillips and Drew exercise was to quantify the impact of each policy upon the financial statements, but this ultimately proved too difficult. The narrative explanations of accounting policies in company accounts are an expensive field of study, if only because a considerable degree of technical skill is needed in reading them.

There can also be a degree of subjectivity in interpretation, which means that results derived from such a dataset need to be interpreted with some caution. In embarking on secondary data analysis, one must adopt the judgments and any flaws in the processes of the original data collectors. For example, some analysts in the team may be more experienced and be able to identify more items on the accounting health check for their companies. If analysts specialised by industrial sector, this could introduce an industry effect into the data, which needs to be controlled for.

Table 2 describes the most likely financial statement effect of the policies included in Smith (1992) and Smith and Hannah (1991). In many cases it is also possible for a company to employ the policy in the reverse way to that described in the table. In some circumstances, where the company views a loss as inevitable it may, apparently perversely, exaggerate the reported loss (a strategy commonly known as 'taking a bath'). Following a corporate reorganisation or a change in senior personnel, 'taking a bath' can flatter reported performance in the first period of the new regime. Table 2 is compiled under the assumption that such a scenario is exceptional since a company indulging in this behaviour could not survive in the longer term. The usual motivation for creative accounting is therefore assumed to be the improvement of some aspect of current reported performance.

Given that the effect of each individual policy is so difficult to ascertain, forming a composite

Table 2
The likely financial statement effects of Smith (1992) and Smith and Hannah (1991) policies

Policy	Smith (1992) Policy No.	S&H (1991) Policy No.	*Most likely income effect*	*Most likely balance sheet effect*	*Most likely motivation*
Pre-acquisition write down	1	N/A	Future income increasing	Reduces net assets	Income increasing
Disposals above the line/ Deconsolidation	2	N/A	Current income increasing	Reduces net assets	Income increasing
Earn outs	3	9	Current income increasing Future income decreasing	Increase in net assets	Commercial
Extraordinary/exceptional items	4	2	Increase trading profit	None	Income increasing
Off balance sheet finance	5	3	Indeterminate	Increase in net assets	Net asset increase and reduction in capital gearing
Contingent liabilities	6	N/A	Increase in current income	Increase in net assets	Income increasing
Capitalisation of interest	7	4	Increase in current income	Increase in net assets	Income increasing
Brand accounting	8	6	Indeterminate	Increase in net assets	Net asset increase and reduction in capital gearing
Changes in depreciation	9	7	Current and future income increasing	Indeterminate	Income increasing
Convertible stocks with put options	10	N/A	Increase in current income (possible future income decrease)	Increase in current net assets (possible future decrease)	Increase in long term risk to increase current income and net assets
Accounting for pensions	11	8	Increase in current income	None	Income increasing
Currency mismatching	12	10	Increase in current income (possible future income decrease)	Increase in current net assets (possible future decrease)	Increase in long term risk to increase current income and net assets
Changes in provisions	N/A	1	Current income increasing	Reduces net assets	Income increasing
Material non-trading profits	N/A	5	Current income increasing	None	Income increasing
Low tax charge	N/A	11	Current income increasing	Reduces net assets (deferred tax provision)	Income increasing

measure of creative accounting is a problem. A common approach taken by researchers is to identify which individual accounting policies are 'income-increasing' policies and which 'income-decreasing', and to study the effect of each separately. This allows theoretical predictions about the expected signs of the regression coefficients but such models typically report low explanatory power. A probable reason for this approach is that the policy choices are being modelled as independent dichotomous decisions. However, other research findings indicate that accounting policy involves a strategic comprehensive decision among interactive policies.

Zmijewski and Hagerman (1981) address this problem by the use of 'n-chotomous' probit analysis with a dependent variable representing a choice among various 'income strategies' arising from a combination of four policy choices: depreciation policy, stock valuation, accounting for pension costs and tax accounting. Their approach requires a ranking of the alternative strategies and evaluation of which are likely to increase, or decrease, reported earnings. Even this methodology does not include an evaluation of the absolute impact of each policy. Zmijewski and Hagerman (1981) firstly assume that the effect of each strategy is equal, and secondly that two strategies have half the effect of the others.

In this study, two competing hypotheses relating to the policy choices are tested:

> H_0: The null hypothesis: accounting policy choice has no systematic components so that idiosyncratic and company specific factors predominate. The empirical prediction is that cross-sectional models cannot be used to explain accounting policy choices.
>
> H_1: The positive hypothesis: accounting policy choices are economic choices determined by considerations of efficient contracting and political costs. The empirical prediction is that accounting policy choices will be associated with economic factors identified by theory and prior research.

To this end, two types of analysis are presented. First, logit regression models for each of the 12 individual policy decisions are constructed and, secondly, the decision is modeled as a portfolio choice. In the absence of any information that could be used for weighting the effects of the 12 policies, they are each given equal prominence in the composite measure. This has the effect of adding together policies that are potentially income-increasing with those that are potentially income-decreasing. Although it would be possible to construct separate models for income-increasing and income-decreasing policies, this analysis has not been undertaken for two reasons. First, the difficulty and subjectivity in assessing which policy belongs to which category; and second, because the sample size is relatively small, there is a large number of control variables and further analysis of subsamples is likely to result in insufficient degrees of freedom.

We therefore refrain from making predictions about the expected signs of coefficients in the models presented in this paper. The effect of aggregating the policy choices is that income-increasing and income-decreasing policies will act in opposite directions thus reducing the explanatory power of the model. Since the explanatory power of our composite model is comparable to other similar studies, this mixing problem has not proved to be severe.

3. Literature and background

The research programme to understand accounting policy choices as economic choices is associated most strongly with Watts and Zimmerman (WZ) who instituted the use of agency theory variables to explain accounting choices. These efficient contracting models have been subjected to a large number of empirical tests in a variety of settings; while in some cases the models are not particularly powerful, there is sufficent consistency across a number of studies to justify the interest (see Holthausen and Leftwich, 1983 for an early review of the literature and WZ for later work [WZ, 1978, 1986, 1990]). The efficient contracting literature identifies a number of accounting and economic variables that appear to affect the choice of accounting policy.

3.1. Political visibility

Jensen and Meckling (1978) argued that certain pressure groups within an economy lobby for regulators and other political authorities to transfer wealth away from large corporations. In particular, it was hypothesised by WZ (1978) that larger companies, with greater political visibility, are more likely to suffer costs associated with political and/or regulatory control of the firm or industry. The proxy usually employed in empirical studies for political visibility is size, represented by (log of) annual turnover or market value.

Evidence in support of the relevance of these variables is provided by WZ (1978), Hagerman and Zmijewski (1979), Bowen, Noreen and Lacey (1981), Leftwich, Watts and Zimmerman (1981), Zmijewski and Hagerman (1981), Daley and Vigeland (1983), Holthausen and Leftwich (1983), Lee and Hsieh (1985), Morris (1987), Dhaliwal (1988), Holthausen (1990), WZ (1990), Cushing and LeClere (1992).

The regression models in this paper include four such variables: (the natural log of) income, (the natural log of) company market value, a dummy variable reflecting externally regulated industries and a variable reflecting material acquisitions by the group during the period of study. Income (INC) and market value (CAP) proxy for size, complexity and the political visibility of the organisation. *Datastream* items 104, 809, 838 or 805 are used as income measures, depending on the type of company, and *Datastream* item MV is the market capitalisation measure.

In addition to the WZ argument that large companies face more costs due to political lobbying, these companies also have more resources in terms of accounting or legal expertise and engage in more complex and material accounting transactions. In particular, larger organisations have more opportunity to employ creativity in group accounting, consolidation, foreign exchange and reserve accounting. The potential for creativity in consolidation policy is captured by a dummy variable (SUBSID) which takes the value of one when a company has made material acquisitions during the last two periods and zero otherwise. Companies with acquisitions were identified by reference to the Extel 'Takeovers, Offers and New Issues' reports. The monopoly power of the company and financial constraints placed upon it by regulatory bodies are reflected in a variable (REG) which takes the value of one where the industry is externally regulated (water, electricity, telecommunications, banking and insurance) and zero otherwise.

3.2. Restrictive debt covenants

One of the most powerful parties in the contracting/monitoring arrangement with the firm is the provider of loan finance. The vast majority of loan finance in the UK is provided privately by banks and financial institutions, and the associated loan covenants are frequently couched in terms of accounting variables. For example, banks may require a company to limit dividends to profit ratios or maintain given levels of liquidity or gearing. WZ (1986) suggested that the closer a company is to breaching a restrictive covenant, the more likely it is to select accounting methods that will forestall or prevent the breach. In the majority of cases this implies an incentive for income increasing policies to maximise reported profit and equity, thus minimising capital gearing and income gearing.

In certain cases, however, there may be an incentive for income decreasing policies. For example, where a geared company has exceptionally high earnings in one year, which are not expected to be sustainable, the company may wish to smooth the effect over subsequent periods, especially if it has a covenant with target profit ratios. A similar situation may also occur with exceptionally low earnings when the company has no hope of meeting targets in the current year and there may be a temptation to 'take a bath' in order to improve chances the following year. In empirical studies the effect of restrictive debt covenants is usually proxied by a measure of gearing (either capital or income gearing).

In a survey of UK lending institutions, Citron (1992) found that 61% of his sample were more likely to include financial ratios covenants in their loan agreements if the borrower was already highly geared. The same study also suggested that companies are effectively able to circumvent such restrictions by accounting policy choice, since 60% of the lending institutions reported that they would be unlikely to take action in the case where a policy change had been made to avoid a breach of covenant. There is also a suggestion in the Citron study that lenders view increases in gearing due to acquisition differently from 'organic deterioration in performance', with the latter being far more likely to incur penalties. This finding implies that a study of policy choice should not necessarily treat all highly geared companies as a homogeneous group but should partition the sample. Reviews of other previous studies which found gearing or other measures of restrictions due to debt covenants to be significant can be found in WZ (1990) and Citron (1992).

Debt covenants are proxied in this study by two measures of gearing: capital gearing (CG) for the balance sheet, measured by the debt/equity ratio (*Datastream* items (321+309)/322), and income gearing (IG) for the profit and loss account (*Datastream* item 732), measured by total interest paid/ (operating profit+non-operating income). In line with the suggestion of Citron (1992) that debt covenants are likely to be less restrictive when gearing increases due to acquisition, variables were also constructed to represent the interaction between gearing and acquisitions, but neither of these interaction variables proved significant in either of the two models.

3.3. Business/earnings risk

The volatility of earnings/cash flows of the business is believed to affect accounting policy choice since more volatile companies are likely to employ techniques to smooth out the earnings pattern. Proxies employed for risk include the market or accounting beta (Zmijewski and Hagerman (1981); Lys (1984); Arnold (1994)) and the variance in historic earnings (Dhaliwal (1988); Christie (1990)). Dhaliwal (1988) concludes that risk, measured by variance in earnings, has an interactive effect with the size and gearing variables and that earnings volatility is much more significant to smaller and highly geared companies.

In this paper, earnings variability (RISK) is measured by the coefficient of variation in earnings before interest and taxation over each of the last 10 years or a shorter period if the company has been floated within that time. The coefficient of variation is the standard deviation scaled by the mean of earnings, which removes any size effect.

3.4. Opportunistic behaviour by management

Many studies postulate that the type of compensation contract held by senior management and/or senior finance officers can affect the choice of accounting policy. In the UK there is insufficient disclosure of bonuses and the terms of compensation contracts, so researchers have tended to use a dummy variable reflecting the presence of share options (e.g. Arnold, 1994) as a proxy for management compensation.

The most extensive work performed on the effect of management bonus schemes is that of Healy (1985), Gaver, Gaver and Austin (1995) and Holthausen, Larcker and Sloan (1995). These papers suggest that the binary dummy variable approach is inadequate, since the nature of the relationship between reported earnings and bonuses is affected by the exact contractual terms of the bonus scheme and is rarely linear. A review of the published details of management salaries indicated that since the companies in this sample are all large UK companies they virtually all have managerial share options, therefore a management compensation variable is not included in the models detailed later.

3.5. Industry effects

In addition to size, a number of studies identify industry effects in accounting policy choices. The reasons offered and proxies employed vary across a number of studies. For example, Zmijewski and Hagerman (1981) employ measures of capital intensity as a proxy variable on the grounds that in service industries, the cost of (human) capital is expensed through the income statement whereas industries with a high proportion of physical capital (fixed assets) will capitalise such expenditure in the balance sheet. The service industries therefore have a greater incentive to employ income increasing strategies in order that their published results are comparable to those of capital intensive industries. Zmijewski and Hagerman (1981), Wong (1988) and Cahan (1992) also employ market concentration or monopoly power as a proxy for industry/political visibility. It is argued that firms in highly concentrated industries, those with a higher degree of monopoly power, are more likely to employ income decreasing strategies to avoid the censure of the Monopoly and Mergers Commission or other competition authorities.

As well as market concentration and capital intensity effects, firms within a given industry will also employ similar accounting policies for reasons of competition and so that published results are in line with industry standards for benchmarking purposes. Accounting policy choices are thus known to vary with industry. Other studies that have used an industry variable in this context include WZ (1978), Lee and Hsieh (1985), Niehaus (1989), Albrecht and Richardson (1990) and Mangos and Lewis (1995). In discussing the provenance of the data, we observed that engaging in secondary analysis of qualitative data compiled by a team of analysts might create the need to control for industry effects.

The clustering of accounting policies by industry is regarded as essentially neutral mutations in the preferred portfolios of choices within industries. Industry dummies are included in the models to provide the background against which to assess the effect of the efficient contracting variables. Their inclusion, we find, also improves the model diagnostics and specifically reduces the specification problems that can arise due to omitted variables. The industry categories employed are those in the original company health check published in *Accounting for Growth*.

4. The sample data and regression models

4.1. The sample

The sample derives from the accounting policy data reported by Smith (1992) for 208 of the largest UK companies. Of these companies, eight were excluded because their financial disclosure was insufficient for this analysis; four of these were merchant banks and four were private limited companies. Data were collected from *Datastream* for the set of annual accounts published by the companies during 1991. The earlier in-house analysis compiled by Smith and Hannah (1991) for UBS Phillips and Drew provides the opportunity to test, to a limited extent, the stability of the model through time. It is not possible to replicate the model precisely in this earlier time period since the Smith and Hannah accounting policies identified in the 1991 study differ from those in 1992. The Smith and Hannah accounting choices are tested using annual accounting information published in 1990.

The results presented in this paper concentrate specifically upon the accounting policy choices identified by Smith (1992) and Smith and Hannah (1991) as being the main instruments of creative accounting. The two reported regression models each employ a different transformation of this vector of policy choices as the dependent variable. The first model treats each policy choice as if it were an independent decision and models each with logit regression. The second model derives an aggregate measure of creative accounting from the accumulated policy choices and has been estimated by OLS regression, Poisson regression and negative binomial regression.

Model I

Separate logit regressions were run for each of the 12 individual accounting policies.

Univariate statistics for all relevant variables are reported in Table 3. The correlation matrices in Panel B and Panel D of Table 3 indicate that the data contains some significant correlation between variables. In both the 1991 and 1992 datasets there are significant positive relationships in CAP/INC (both size measures with correlation factors of 0.43 in 1992 and 0.40 in 1991) and REG/RISK (correlation factors of 0.51 in 1992 and 0.48 in 1991). Negative relationships exist between INC/IG (a coefficient of −0.36 in 1991, insignificant in 1992) and CG/REG (a coefficient of −0.33 in 1992, insignificant in 1991).

The degree of multi-collinearity in this dataset is not a problem in Model I, since maximum likelihood estimation is employed and no attempt is made to interpret the magnitude of the resulting coefficients. Model II, which employs ordinary least squares estimation, includes the variables CG, CAP, REG and SUBSID. Of these, only CG and REG are correlated to any significant extent (33% in 1992 and not significant in 1991). In view of the above considerations, multi-collinearity is not considered a major problem in these analyses.

Variables that were not significant were eliminated from the logit models and therefore the models of each different policy include different sub-sets of the variables detailed above (Tables 4 and 5).

Model II

Model II is estimated by OLS, Poisson and negative binomial regressions:

$$SCORE_i = \alpha_0 + \beta_1 CG_i + \beta_2 CAP_i + \beta_3 REG + \beta_4 SUBSID + Industry + \varepsilon_i$$

where the variables are as defined for Model I.

All of the independent variables in Model II (except the dummies) are standardised by subtracting the sample mean and dividing by the sample standard deviation, in order that the size of the regression coefficients can be directly compared (Tables 6 and 7). This is a linear transformation that does not alter the fit of the model, but ensures that the regression coefficients have no unit of measurement.

5. Empirical results

The regression results are set out in Tables 4, 5, 6 and 7.

Model I

In Tables 4 and 5, the chi-squared statistics for the fit of the logit model for each policy indicate all models are highly significant and pseudo-R^2 values range from 29% to 87%.[3]

In all cases, the overall accuracy in the classification of users/non-users of the policy is greater than could arise by chance. However, for policy three in the Smith (1992) sample the prediction that no firms use the policy is more accurate than the model. The model also tends to classify non-users of the policies with much more accuracy than users and the type II error rates are high in some cases.

The balance between type I and II errors depends where the cut-off is made, but that caveat aside, it appears that certain individual accounting policies are used with a greater frequency than the economic pressures measured in these models would indicate. These findings are consistent with other logit models of accounting policy choice (for examples see Wong, 1988; Cushing and LeClere, 1992; Arnold, 1994). An important caveat is that the classification tests are conducted on the sample that is used for estimation. This can overstate the predictive ability of the models; typically, out of sample performance is lower.

5.1. Relevant factors in the Smith (1992) sample

Controlling for clustering of policies by industrial classification is relevant in all of the policy choices apart from policy 4 (extraordinary items). The gearing measures are significant to policies 4, 5, 7, 9, 10, 11 and 12 (extraordinary items, off balance sheet financing, changes in depreciation, complex capital instruments, pension fund accounting and currency mis-matching). Size is important in all policies except 3, 6, and 10 (deferred consideration, contingent liabilities and complex capital instruments). The acquisition of subsidiaries affects policies 2, 3, 8 and 12 (disposals above the line, deferred consideration, brand accounting and currency mis-matching) and the existence of an industry regulator affects policies 1, 4, 6 and 12 (pre-acquisition write-down, extraordinary items, contingent liabilities and currency mis-matching).

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[3] A caveat in interpreting significance for the models reported is the deletion of non-significant industry dummies. Originally 32 industry categories were fitted to the data, but in any one model most of the coefficients on these dummies are insignificantly different from zero. In reporting the models (including only significant industry categories) the goodness of fit is not changed, but the associated degrees of freedom increase. We are grateful to an anonymous reviewer for drawing our attention to this problem, which is endemic in general to specific modelling. The effect on the adjusted R-squared for the models is included in the results tables and given by

$$\bar{R}^2 = 1 - \left[(1 - R^2)\frac{n-1}{n-k} \right]$$

Where n = 200 (the sample size) and k = 13 for parameters fitted, or k = 38 including deleted variables.

Model 1

$$POLICY_i = \alpha_0+\beta_1\, INC_i+\beta_2 SUBSID+\beta_3 REG+\beta_4 CAP_i+\beta_5 IG_i+\beta_6 CG_i+\beta_7 SCORE_i+\beta_8 RISK_i+Industry+\varepsilon_i$$

where

$POLICY_i$ = The probability that the accounting policy is used by the ith company

INC_i = The (natural log of) income of company i

SUBSID = A dummy variable which takes the value of one when a company has acquired a subsidiary during the last two periods and zero otherwise

REG = A dummy variable which takes the value of 1 for a regulated industry and zero otherwise

CAP_i = The (natural log of) market value of company i

IG_i = Income gearing, represented by the interest cover of company i

CG_i = The balance sheet debt/equity ratio of company i

$SCORE_i$ = The cumulative creative accounting score of the company (number of creative policies used)

$RISK_i$ = The earnings volatility company i: measured by coefficient of variation of EBIT over the last 10 years

Industry = Dummy variables which represent the industry classification of the companies in the sample

ε_i = Error term

In the prior literature political visibility is hypothesised as being an important determinant of accounting policy. Here we observe that companies overseen by an industry regulator make less use of pre-acquisition write-downs, contingent liabilities and currency mis-matching, but more use of extraordinary items. The earnings volatility is significant to policies 3, 8, 9 and 12 (deferred consideration, brand accounting, changes in depreciation and currency mis-matching). The overall creative accounting score (number of policies used) is highly significant in all cases. This is consistent with a tendency of companies to use the policies together as a set (or subset) rather than separately selecting each policy.

5.2. Additional evidence provided by the Smith and Hannah (1991) sample

As with the Smith (1992) sample, the individual accounting policy models are highly significant in the second sample. The results overall are very similar and in most cases the factors predicting each policy are similar but not identical. For example, extraordinary items (policy 2 in Smith and Hannah, 1991 and policy 4 in Smith, 1992) is related to INC, CAP, REG, CG and SCORE in 1992 and SUBSID, CAP, CG and SCORE in 1991). The sample of companies and set of policies analysed in 1991 is not sufficiently similar to the 1992 analysis to draw a definite conclusion, but results tentatively suggest that the individual policy choice models can be applied in time periods other than 1992.

Model II

5.3. The Smith (1992) sample

The use of creative accounting policies identified by Smith (1992) can be explained by the hypothesised economic factors. The results are reported both with and without the industry dummies (Table 6). The explanatory power of the OLS model, adjusted R-squared, is 43.7% which is slightly higher than other cross-sectional models of this type and is due to the number of control variables used in this study. The agency theory variables explain 20% of the policy choices with controls for industry adding another 27%. Capital gearing, market capitalisation, regulation, industry effects and acquisitions are all significant at the 5% level. The relative size of the coefficients shows that individual industry effects have the greatest impact upon its accounting policy choices. Once industry effects are accounted for, then industry regulation, market value, capital gearing and the acquisition activity of the company are the factors in diminishing order of importance.

The industry variables that are significant in the 1992 dataset are those for telecommunications, water, composite insurance, business services, oil and gas, transport and health and household. The last five industries have negative regression coefficients and thus tend to use fewer creative accounting policies than average. The positive coefficients on telecommunications and water industries need to be read in conjunction with the negative coefficient on the regulation variable, since these two are amongst the larger group of regulated industries. Analysts specialising in particular industries, so that analyst differences add to the true industry effects, may amplify the strength of this association. Without knowledge of the internal consis-

Table 3
Models I and II: Univariate descriptive statistics

Panel A: Smith (1992) sample (before standardisation)

	Inc (ln)	SUBSID	REG	CAP (ln)	IG %	CG %	SCORE	RISK
Number	200	200	200	200	200	200	200	200
Min	0.00	0.00	0.00	11.32	0.23	0.00	0.00	0.12
Max	17.54	1.00	1.00	17.54	538.09	90.28	9.00	2.64
Mean	14.11	0.31	0.30	14.01	30.25	31.14	3.05	0.95
Median	14.15	0.00	0.00	13.86	21.25	30.92	3.00	0.61
Std dev	1.51	0.46	0.46	1.18	49.57	16.93	1.92	0.73

Panel B: Correlation matrix for independent variables (1992 sample)

	Inc	SUBSID	REG	CAP	IG	CG	SCORE	RISK
INC	1.00							
SUBSID	−0.07	1.00						
REG	−0.05	−0.07	1.00					
CAP	0.43	−0.01	0.25	1.00				
IG	−0.05	−0.04	−0.02	0.10	1.00			
CG	−0.02	0.15	−0.33	−0.03	0.14	1.00		
SCORE	0.10	0.18	−0.37	0.04	0.06	0.29	1.00	
RISK	−0.16	−0.08	0.51	−0.05	−0.15	−0.26	−0.30	1.00

Panel C: Smith and Hannah (1991) sample (before standardisation)

	Inc (ln)	SUBSID	REG	CAP (ln)	IG %	CG %	SCORE	RISK
Number	186	186	186	186	186	186	186	186
Min	0.00	0	0	10.34	0	0	0	0.16
Max	17.55	1	1	16.84	290.10	162.50	9.00	3.32
Mean	13.92	0.35	0.12	13.72	28.86	35.98	2.38	0.98
Median	14.10	0	0	13.76	23.47	34.72	2.00	0.69
Std dev	1.63	0.48	0.32	1.16	30.07	21.54	1.58	0.79

Panel D: Correlation matrix for independent variables (1991) sample)

	Inc	SUBSID	REG	CAP	IG	CG	SCORE	RISK
INC	1.00							
SUBSID	0.04	1.00						
REG	0.04	−0.20	1.00					
CAP	0.40	−0.07	0.26	1.00				
IG	−0.36	−0.07	0.02	−0.02	1.00			
CG	−0.05	0.25	−0.25	−0.08	−0.49	1.00		
SCORE	0.11	0.01	0.00	0.09	0.00	0.17	1.00	
RISK	−0.24	−0.13	0.48	0.01	−0.01	−0.16	0.06	1.00

tency of the original data it is impossible to separate the two effects.

Although the creative accounting measure employed as the dependent variable in the regression model is ordinal, skewed and truncated, the OLS model is reasonably well specified. Even so, to test for robustness, maximum likelihood estimates based on a Poisson error distribution are also reported (Table 6). Parameter estimates in this regression are smaller than those for OLS, but the improved model F-statistic evidences the better fit of a Poisson error distribution for count data. All the variables in the OLS model are robust to the alternative specification and the signs on the coefficients remain unchanged. The model was also tested for over-dispersion using negative binomial regression.[4]

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[4] The negative binomial model embeds the Poisson as a special case and is appropriate when the number of counts has

Table 4
Model I Logit regression estimates for each accounting policy model (Smith, 1992, Dataset)

Model:
$\text{POLICY}_i = f\{\alpha_0+\beta_1\,\text{INC}_i+\beta_2\text{SUBSID}+\beta_3\text{REG}+\beta_4\text{CAP}_i+\beta_5\text{IG}_i+\beta_6\text{CG}_i+\beta_7\text{SCORE}_i+\beta_8\text{RISK}_i+\text{Industry}\}+\varepsilon_i$

Where $f\{.\}$ is the logistic transformation

Policy	No. Using Policy	INC	SUBSID	REG	CAP	IG	CG	SCORE	RISK	IND	Const.	Overall Classifcn[a] %	Model Pseudo R-Square[b]	Model Chi Square[c]
1	69	*1.68	—	***−1.20	*−1.16	—	—	*1.04	—	**	*−11.52	84	63.6	*123.38
2	81	*0.55	*1.36	—	—	—	—	*0.81	—	***	*−11.09	79	50.2	*92.96
3	25	—	**1.05	—	—	—	—	*0.41	**−1.20	*	*−3.31	90	29.1	*33.41
4	125	*0.59	—	***0.76	*−1.05	—	**0.03	*0.77	—	—	†3.76	76	44.2	*78.40
5	22	—	—	—	**0.71	—	*−0.11	*1.27	—	*	*−16.96	94	60.3	*71.79
6	48	—	—	**−3.04	—	—	—	*0.66	—	*	*−3.52	85	41.3	*64.55
7	63	***−0.35	—	—	**0.61	**0.01	—	*0.68	—	*	*−8.52	81	52.6	*93.84
8	14	—	**−3.66	—	**0.99	—	—	**1.31	***1.09	*	*−24.71	95	62.1	*56.79
9	23	**−1.56	—	—	*1.39	*−0.01	—	**0.39	*1.54	*	†−3.09	91	54.3	*64.88
10	24	—	—	—	—	***0.01	—	*1.13	—	*	*−11.09	94	58.0	*71.77
11	82	—	—	—	**−0.57	—	***0.03	*0.75	—	*	†−2.85	78	48.5	*89.20
12	24	**−0.42	**1.28	—	*1.22	***−0.05	—	*0.94	†0.94	*	*−18.00	92	56.7	*69.84

Notes:
— = Variable not employed in regression model

*Variable significant at 1%
**Variable significant at 5%
***Variable significant at 10%
†Variable significant at more than 10%

[a] Overall classification is the total % of companies correctly classified with respect to each policy
[b] The Pseudo R-squared for the model is the Nagelkerke R-squared
[c] Chi-squared statistic includes Yates' correction for a 2 × 2 classification

Policy numbers:

1. Pre-acquisition write-down
2. Disposals above the line
3. Deferred consideration (earn-outs)
4. Mis-classification of extra-ordinary and exceptional items
5. Off balance-sheet financing
6. Contingent liabilities
7. Capitalisation of interest
8. Brand accounting
9. Changes in depreciation policy
10. Convertible stock with put options
11. Accounting for pension fund surpluses
12. Currency mismatching

Table 5
Model I: Logit regression estimates for each accounting policy model (Smith and Hannah, 1991, Dataset)

Model:

$$\text{POLICY}_i = f\{\alpha_0+\beta_1\,\text{INC}_i+\beta_2\text{SUBSID}+\beta_3\text{REG}+\beta_4\text{CAP}_i+\beta_5\text{IG}_i+\beta_6\text{CG}_i+\beta_7\text{SCORE}_i+\beta_8\text{RISK}_i+\text{Industry}\}+\varepsilon_i$$

Where $f\{.\}$ is the logistic transformation

Policy	No. Using Policy	INC	SUBSID	REG	CAP	IG	CG	SCORE	RISK	IND	Const.	Overall Classifcn[a] %	Model Pseudo R-Square[b]	Model Chi Square[c]
1.	105	**0.43	—	—	—	—	—	*1.54	—	*	*−8.57	82	64.7	*122.49
2	58	—	**1.19	—	*−0.83	—	**−0.03	*1.36	—	**	**7.45	88	59.0	*101.06
3	31	—	***1.27	—	—	**0.03	**−0.08	*2.20	***0.64	*	*−9.55	92	72.0	*103.79
4	50	*0.59	**−0.91	**−1.62	*0.46	***0.01	—	***0.29	—	*	*−8.50	81	32.9	*47.72
5	62	—	—	—	—	—	—	*0.75	*−0.79	*	*−2.50	79	41.1	*65.27
6	14	—	—	–	***0.75	—	—	***0.62	†0.43	*	*−18.14	96	57.8	*50.89
7	17	*−0.97	—	—	*1.37	**−0.08	—	*1.46	†−1.45	*	***−11.08	96	63.0	*63.27
8	52	†0.32	—	—	—	*−0.08	***0.02	*0.65	—	*	**−7.05	82	48.5	*76.46
9	9	—	*2.15	—	*1.83	—	†−0.01	**0.75	†0.77	*	**16.29	97	48.3	*31.37
10	15	**−13.35	**−7.59	—	*14.44	—	**0.26	**2.40	—	**	**−248.53	98	87.0	*86.99
11	30	—	—	*2.06	—	—	—	*0.75	—	*	*−5.95	91	51.6	*67.13

Notes:
— = Variable not employed in regression model

*Variable significant at 1%
**Variable significant at 5%
***Variable significant at 10%
†Variable significant at more than 10%

[a] Overall classification is the total % of companies correctly classified with respect to each policy
[b] The Pseudo R-squared for the model is the Nagelkerke R-squared
[c] Chi-squared statistic includes Yates' correction for a 2 × 2 classification

Policy numbers

1. Changes in provisions
2. Extraordinary items*
3. Off balance-sheet financing*
4. Capitalisation of interest*
5. Significant non-trading profits
6. Brand accounting*
7. Changes in depreciation policy*
8. Accounting for pension fund surpluses*
9. Deferred consideration (earn-outs)
10. Currency mis-matching
11. Unusually low tax charges

(* = Accounting policy also examined in the 1992 study)

Table 6
Model II: Regression parameter estimates Smith (1992) sample

Model: $SCORE_i = \alpha_0 + \beta_1 CG_i + \beta_2 CAP_i + \beta_3 REG + \beta_4 SUBSID + Industry + \varepsilon_i$
In OLS model the distribution of ε_i is assumed to be normal.
In Poisson regression the maximum likelihood estimates assume that ε_i are Poisson distributed

Method of estimation	*OLS: efficient contracting variables only* [t-value]	*OLS: efficient contracting variables and significant industries* [t value]	*Poisson regression* [t-value]
CG	0.297	0.428	0.129
	**[2.347]	*[3.518]	*[0.713]
CAP	0.247	0.463	0.166
	***[1.847]	*[3.668]	*[3.482]
REG	−1.443	−2.360	−1.021
	*[−5.138]	*[−10.080]	*[−6.926]
SUBSID	0.558	0.459	0.144
	**[1.951]	**[1.929]	***[1.624]
Composite insurance		−1.455	−2.032
	—	*[−3.525]	**[−2.002]
Misc.		−2.877	−1.148
	—	*[−4.764]	**[−1.939]
Telecommunications		2.278	0.961
	—	*[7.322]	*[3.097]
Business services		−2.084	−1.377
	—	*[−2.881]	**[−2.372]
Oil and Gas		−1.422	−0.470
	—	*[−2.739]	***[−1.776]
Transport		−1.285	−0.400
	—	*[−2.775]	***[1.852]
Health and household		−1.550	−0.533
	—	*[−2.935]	**[−2.189]
Water		3.642	1.365
	—	*[14.855]	*[6.569]
Constant	3.305	3.642	1.274
	*[18.118]	*[19.888]	*[21.996]
R-squared/Pseudo R-squared	0.201	0.471	0.165
Adj. R-squared[1]	0.185	0.437	—
Adj. R-squared[2]	0.185	0.350	—
F-statistic/chi-sq.	*12.298	13.876	*134.317
	F-stat	F-stat	Chi-sq.
Normality test	4.540	4.103	—
(Chi-sq)[3]	[Pr=0.103]	[Pr=0.129]	
Heteroskedasticity test	1.740	12.651	—
(Chi-sq.)[4]	[Pr=0.187]	[Pr=0.000]	

Notes:
*Significant at 1%, **Significant at 5%, ***Significant at 10%

1. Adj. R-squared with degrees of freedom based on number of variables in model
2. Adj. R-squared with degrees of freeedom based on number of variables in model plus deleted variables (see footnote 1)
3. Based on a test of skewness and kurtosis of residuals
4. Based on the regresion of squared residuals on squared fitted values

Table 7
Model II: Regression parameter estimates: Smith and Hannah (1991) sample

Model: $SCORE_i = \alpha_0 + \beta_1 CG_i + \beta_2 CAP_i + \beta_3 REG + \beta_4 SUBSID + Industry + \varepsilon_i$
In OLS model the distribution of ε_i is assumed to be normal.
In Poisson regression the maximum likelihood estimates assume that ε_i are Poisson distributed

Method of estimation	*OLS: efficient contracting variables only* [t-value]	*OLS: efficient contracting variables and significant industries* [t value]	*Poisson regression* [t-value]
CG	0.284	0.530	0.210
	**[2.325]	*[3.817]	*[4.442]
CAP	0.140	0.306	0.152
	****[1.202]	*[2.769]	*[2.878]
REG	0.178	−1.568	−1.218
	****[0.468]	*[−5.595]	*[−2.915]
SUBSID	−0.199	−0.336	−0.138
	****[−0.797]	****[−1.521]	****[−1.288]
Engineering	—	1.734	0.657
		*[3.737]	*[3.365]
Brewers	—	0.890	0.322
		*[3.151]	****[1.268]
Food manufacture	—	0.585	0.231
		****[1.514]	****[1.208]
Property	—	−1.682	−1.129
		*[−5.754]	****[−3.087]
Media	—	0.555	0.242
		****[1.010]	****[1.156]
Stores	—	1.581	0.602
		*[2.963]	*[3.478]
Textiles	—	0.914	0.413
		****[1.184]	****[1.479]
Chemicals	—	0.951	0.389
		***[1.795]	****[1.528]
Transport	—	0.750	0.306
		***[1.602]	****[1.477]
Water	—	4.198	2.177
		*[13.827]	*[4.846]
Telecommunications	—	2.573	1.560
		**[1.997]	*[2.952]
Constant	2.431	2.145	0.731
	*[15.891]	*[13.047]	*[8.353]
R-squared/Pseudo R-squared	0.036	0.384	0.117
Adj. R-squared[1]	0.015	0.329	—
Adj. R-squared[2]	0.015	0.269	—
F-statistic/chi-sq.	*1.696 F-stat	*7.055 F-stat	*79.533 Chi-sq.
Normality test (Chi-sq.)[3]	5.958 [Pr=0.050]	3.381 [0.184]	—
heteroskedasticity test (Chi-sq.)[4]	**4.627	**5.573	—

Notes:
*Significant at 1%, **significant at 5%, ***Significant at 10%, ****significant at 15%
1. Adj. R-squared with degrees of freedom based on number of variables in model
2. Adj. R-squared with degrees of freedom based on number of variables in model plus deleted variables (see footnote 1)
3. Based on a test of skewness and kurtosis of residuals
4. Based on the regression of squared residuals on squared fitted values

5.4. The Smith and Hannah (1991) sample

The regression results for 1991 are reported in Table 7. In this case the adjusted R-squared for the OLS model is 32.9%. The OLS model containing only the efficient contracting variables is poorly specified and the residuals are not normal. This problem is alleviated by the inclusion of the industry dummies. The R-squared statistic for the model without industry dummies is only 4% and the regression is not significant. The R-squared for the model with industry dummies is 38%. The magnitude of the coefficients in 1991 shows industry effects to be the largest factor, followed by industry regulation, capital gearing, acquisitions and market value.

The industry variables that are significant in 1991 are those for telecommunications, water, brewers, engineering, transport, chemicals, food manufacture, media, stores, textiles and property. All industries have positive regression coefficients except for property companies. All the coefficients in the Poisson regression for 1991 are smaller than the OLS estimates and have the same signs. The variables representing the acquisition of subsidiaries and some industry dummies become less significant in this alternative specification. The size, gearing and industry regulation variables remain very significant, but in this earlier dataset their effect is not revealed until industry clustering is controlled.

5.5. Comparing the results of Model I and Model II

The 1991 and 1992 datasets differ in a number of important respects. The analyses of Smith (1992) and Smith and Hannah (1991) employ different accounting policies, use a different sample of companies and different industry classifications. Despite this, three of the efficient contracting variables, capital gearing, market capitalisation and industry regulation are highly significant in both periods and their coefficients are of the same sign.

The industry effects in the two periods are not comparable since the ranges of industries in the two samples are different. The industry effects are included both to provide the context in which the effect of the economic variables can be assessed and to reduce the specification problems arising from omitted variables. The variable reflecting the acquisition of subsidiaries is more significant in 1992 than 1991. This may be due to the larger number of acquisitions in 1992 and, consequently, the inclusion by Smith (1992) of more policies relating to group consolidation.

Overall, the results from both models are consistent with H_1: the positive hypothesis: accounting policy choices are economic choices determined by considerations of efficient contracting variables identified both by theory and prior research. In both Model I and Model II there is a case to be made for the significance of size, gearing and industry regulation variables.

Model I is likely to be more econometrically robust and appropriate for individual policy decisions (see Stone and Rasp, 1991), but these models do not consider the interactive nature of the accounting policy decisions. In this study the results of both models are complementary, and we find that economic variables predict both the choices of particular individual policies and also of the aggregate extent of creative accounting. Model II enabled us to consider the policy choice as a strategic one rather than a series of individual choices but at the cost of strong assumptions about orthogonality and equality of weight of the alternatives.

5.6. Alternative specification of the Model

The nature of the accounting policy choice decision could also imply that changes in accounting policy are more relevant than the observed policies in force at any point in time. It is possible that the preparers of annual reports do not consider the effect of every policy in every set of accounts but only consider changing from the existing set when prompted by some economic consideration, such as an acquisition or re-financing. The auditing profession may also exert influence over the extent to which an organisation can change its policies in a given year and so the choice among policies is cumulative. The preference for consistency in accounting imposes an inertia in accounting policy choice. The present dataset is insufficient to resolve these conjectures, which remain an issue for further research.

6. Conclusion

A significant impediment to a study of creative accounting is the difficulty in defining the concept and in quantifying its effects. The approach of Smith (1992) in documenting the use of 12 key policies yields an empirical taxonomy, but the overall concept remains elusive. A creative accounting variable based upon Smith's analysis is an imperfect proxy for the underlying phenomenon but its use achieves two things: first it is, as far as researchers are concerned, an objective dataset employing the key policies (to the extent that they are observable) constituting the instruments of creative accounting and, second, the dataset is consistent with the view of accounting policy choice as a strategic comprehensive decision. In practice,

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over-dispersion. For this dataset there is no over-dispersion. The mean of the count data is 3.05 and the variance is 3.6575. An LR test of negative binomial against the Poisson shows that a Poisson model is sufficient and therefore the negative binomial results are not reported in this paper.

management is less likely to consider each policy in isolation but to select a set whose combination produces the required effect. Both strategies to modelling the *Accounting for Growth* dataset have been used in this study.

There appears to be little evidence to support Smith's hypothesis that high levels of creative accounting are associated with corporate weakness and declining performance. Instead, his company 'health check' can be understood in the context of recent advances in the economics of accounting policy choice. In this context, the economic rationale for creative accounting is that it can be employed to reduce the agency costs, which arise due to the political visibility, resources and complexity of large organisations, the effects of debt covenants and the perceived requirement for smooth earnings patterns. In contrast to naïve intuition, creative accounting is not solely employed to disguise poor performance, but its use has several other economic explanations.

If accounting policy choices are predictable from the economic characteristics of the organisation and from knowledge of its agency relationships, then accounting policies must have quantifiable economic benefits. Only if accounting choices were costless and the economic consequences minimal would their incidence be random or clustered in neutral mutations. Accounting regulations that restrict natural accounting innovations must be imposing differential costs by disallowing beneficial choices by certain companies.

A further implication of this analysis is the doubt it raises over the assumption employed in much financial research that accounting-based variables are exogenous to the economic characteristics of the organisation. In particular, we observed that accounting policy choices are affected by the presence of an industry regulator. The nature of the relationship between policy choice and published financial results is not, however, a simple 'good news/bad news' signal. Accounting policy choice needs to be understood as a more subtle and complex effect deriving from the nature and terms of the agency relationships between the managers of the firm and its stakeholders.

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Book Review

A lost accounting system and its significance for classical capitalism: The double account system at Schneider & Company in the mid-nineteenth century. *Daijiro Fujimura.* Institute of Advanced Studies, Hiroshima Schudo University, 1998. iix + 69 pp.

This monograph, written in French and English, has been published by the author's university. The study is based on the 19th century records of Schneider & Co. located in the National Archives of France. The French edition was written 'with mainly French economic historians in mind who are in a favourable position, in spite of their backwardness in accounting history research, to appreciate and review the contents' (Preface). It was then translated into English because 'the writer considered it absolutely necessary that the writing be read and reviewed by experts on accounting history. The findings set out in it are, indeed, wholly contrary to their understandings' (Preface). Much of the misunderstanding is thought to have been that of this reviewer.

Daijiro Fujimura is comfortable with generalising from the evidence of a single archive because he believes Schneider & Co. to be one of the most representative industrial enterprises in France. He is to be congratulated on the enormous effort that must have gone into the creation of this second manuscript on the Schneider company (the first appeared in the Japanese journal *Keizaigaku Kenkyu*: 59, 1993) having visited France over a period of many years during the summer vacations. An attraction of that location is the author's conviction that there is a ready availability of unused accounting records due to a lack of serious investigations by French researchers. This overlooks the important work of a small but active group of French accounting historians, led by Yannick Lemarchand and Marc Nikitin, with their fifth annual conference to be held in Orléans in March 1999.

The essence of the case put forward by Fujimura appears to be as follows:

1. Edwards, in an article published in *Abacus* in 1985, misrepresents the nature and extent of usage of the double account system. This article argued that, on the basis of available evidence, the use of the double account system (which broadly divides what is termed here the 'conventional balance sheet' into two-parts—a capital account containing long term capital receipts and expenditures and a general balance sheet listing the remaining items) by railway companies dates from 1838.
2. Anglo-Saxon accounting scholars believe that the accounting system in use today, which Fujimura (without investigating any UK or US archives) is convinced only appeared after 1900, is the only complete system. They stand accused of believing that accounting history is only about the processes of attaining the present system and 'never imaged that before this another system was well established; a system that had its own peculiar, consistent logic and was relevant to the market economy before the supremacy of oligopoly enterprises or cartels in Europe' (p. 11). Central to this observation is the discovery that Schneider & Co. valued stocks at market price and therefore recognised profits on the basis of production rather than sales. This treatment is explained on the grounds that they were operating as pure price-takers in a competitive industry. The author believes that Anglo-Saxon accounting historians would discover that this practice was followed elsewhere if they could abandon their teleological vision of their discipline's history.

I must first put up my hands and accept that my 1985 *Abacus* paper gave the impression that the capital account was a cash-based financial statement. This was sometimes but by no means always the case, and Professor Harold Edey took me gently to task on this matter in an *ABR* review of a book of readings containing this item. The same error was not repeated in *A History of Financial Accounting* published in 1989, which Fujimura has read. However, this is a matter of minor consequence in the context of this debate.

The fundamental flaw in Fujimura's case is that the financial reporting system he is looking at is *not* the double account system. It is a system of head office and branch accounting, with the head office of Schneider & Co. located in Paris (Paris House) and the works established at Le Creusot in south-east France, near Beaune. In common with the double account system, therefore, Schneider & Co.'s record keeping system enables the preparation of two financial statements that can be combined to produce what would today be regarded as the conventional balance sheet, but there the similarity ends. The double account system was designed by railway companies to inform external users about the application of funds invested. Schneider & Co., a limited partnership (*commandite par actions*), although benefiting from finance provided by the sleeping partners Seillière (a banker) and Boigues (an industrialist), represented an ownership structure quite different from railway companies. The key requirement of Schneider & Co., therefore, was an accounting system capable of tracking resources invested in a works located 320 km south of Paris and enabling the relationship between these two entities to be reflected in financial reports.

It is difficult to see how the author could have made this basic error, particularly because he draws attention to the fact (p. 30) that, as early as the end of 1852–53, a conventional balance sheet was prepared for the company as a whole by combining the component parts. A possible explanation for the error is that Schneider & Co. did adopt certain accounting procedures similar to those commonly used by companies employing the double account system of financial reporting, namely closure of the capital account and the use of replacement cost accounting. But as many Anglo-Saxon authors have demonstrated, these accounting procedures have been used by many British companies which presented a conventional, rather than a double account, balance sheet in their financial report.

The discovery that Schneider & Co valued stocks at market prices, thereby sometimes including unrealised profits in the accounts, is interesting and would certainly appeal to committed exit pricers such as Professor Ray Chambers. The conclusion—Fujimura believes that 'the challenge is one of abstracting a common logic from such a particular case' (p. 12)—that a careful examination of accounting records, as opposed to a perceived preoccupation with accounting reports prior to the turn of the century, would reveal the use of such procedures by British companies is far-fetched. The author appears to rely mainly on Johnson and Kaplan for support. References made to the fact that Johnson and Kaplan believed that American companies, in the 19th century, valued inventories at 'approximated current replacement costs' and at 'approximations of market price' are, respectively, unpersuasive in terms of the case presented and disingenuous in terms of content. The policy of valuing stocks at replacement cost would ensure provision for unrealised losses and might, alternatively, result in an element of unrealised profit recognition but rarely, and only by coincidence, to the degree anticipated by the author. Johnson and Kaplan's reference to the use of market prices is confined to the textile industry and a footnote.

Whatever the practices in the US, however, they are not a necessary signal to UK practice. For Britain, Fujimura relies for support on works cited in footnote 20 including those of the present writer. These writings have drawn attention to the use of transfer prices which are sometimes thought to approximate market price to track the movement of goods between processes in order to generate data that could be used for performance assessment and resource allocation decisions. Contrary to Fujimura's understanding, I have examined the accounting records of numerous concerns, admittedly mainly in the iron, coal and steel industries, and have yet to find a single significant case where finished stock was valued by a price taker at market price. Even were this the case, of course, it provides no evidence whatsoever to support the idea that the company was using the double account system.

Finally, Fujimura's insistence that Anglo-Saxon accounting historians will find that companies used the double account system prior to 1900 if they took the trouble to examine accounting records, is entirely without foundation. Firstly, large numbers of pre-1900 records have been the subject of investigation by Anglo-Saxon accounting historians; far more so than post-1900 records. Secondly, the double account system as defined by Anglo-Saxon writers is a framework of *financial reporting*; an examination of the underlying records would tell them how the figures were arrived at but add nothing in helping them to decide whether the double account system was in use. Fujimura may have made some important discoveries—the measurement of profit on the basis of production rather than sales is intriguing. It may also be the case that he has discovered a unique system of record keeping but, if so, the double account system is not the appropriate label to describe it.

Cardiff Business School J. R. Edwards

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Guide for Authors

General

Papers should be in English and consist of original unpublished work not currently being considered for publication elsewhere. They should be typed and double-spaced. *Four* copies should be submitted, together with a submission fee of £18 for subscribers or £36 for non-subscribers. In order to ensure an anonymous review, authors should not identify themselves, directly or indirectly. Experience has shown that papers that have already benefited from critical comment from colleagues at seminars or at conferences have a much better chance of acceptance. Where the research takes the form of field surveys or experiments, *four* copies of the instrument should be submitted. Where the paper shares data with another paper, *four* copies of the other paper must also be provided.

Presentation

A cover page should show the title of the paper, the author's name, title and affiliation, and any acknowledgements. The title of the paper, but not the author's name, should appear on the first page of the text. An abstract of 150–250 words should be provided on a separate page immediately preceding the text. Section headings should be numbered using Arabic numerals.

Tables and figures

Each table and figure should bear an Arabic number and a title and should be referred to in the text. Sources should be clearly stated. Sufficient details should be provided in the heading and body of each table and figure to reduce to a minimum the need for cross-referencing by readers to other parts of the manuscript. Tables and figures should appear at the end of the paper, with its most appropriate placing noted in the paper itself. Diagrams and charts should be submitted in camera-ready form.

Footnotes

Footnotes should be used only in order to avoid interrupting the continuity of the text, and should not be used to excess. They should be numbered consecutively throughout the manuscript with superscript Arabic numerals. They should not be used in book reviews.

References

References should be listed at the end of the paper and referred to in the text as, for example, (Zeff, 1980: 24). Wherever appropriate, the reference should include a page or chapter number in the journal or book in question. Only works cited in the paper should be included in the list. Citations to institutional works should if possible employ acronyms or short titles. If an author's name is mentioned in the text it need not be repeated in the citation, e.g. 'Tippett and Whittington (1995: 209) state...'

In the list of references, titles of journals should omit an initial 'The' but should not otherwise be abbreviated. The entries should be arranged in alphabetical order by surname of the first author. Multiple works by the same author should be listed in chronological order of publication. Some examples are:

Accounting Standards Steering Committee (1975). *The Corporate Report.* London: ASC.

Tippett, M. and Whittington, G. (1995). 'An empirical evaluation of an induced theory of financial ratios'. *Accounting and Business Research*, 25 (Summer): 208–218.

Watts, R. L. and Zimmerman, J. L. (1986). *Positive Accounting Theory.* Englewood Cliffs, NJ: Prentice-Hall.

Style and spelling

Abbreviations of institutional names should be written as, for example, FASB and not F.A.S.B; those of Latin terms should contain stops (thus i.e. not ie). Words such as 'realise' should be spelled with an 's' not a 'z'. Single quotations marks should be used, not double.

Mathematical notation

Mathematical notation should be used only where it adds rigour and precision, and should be properly explained in the text. Equations should be numbered in parentheses, flush with the right-hand margin.